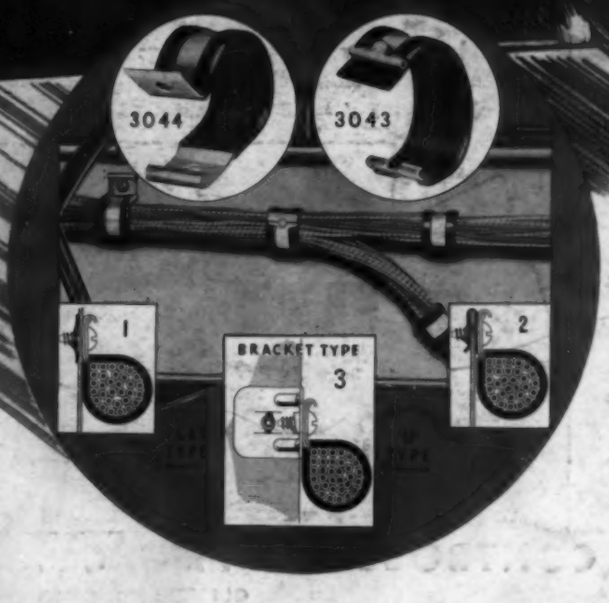
June 15, 1942

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

ESTABLISHED 1882

...Fastest THING IN FASTENINGS!



NEW TINNERMAN SPEED NUTS, SPEED CLIPS and SPEED CLAMPS for aircraft are saving as much as 80% in weight of fastenings and about 50% in application time.

Illustrated: Latching HARNESS SPEED CLAMPS cushioned with extruded plastic channels are snapped on or off in a second. Eliminate taping and "boggles." No. 3043 is used at intermediate locations and for sub-assembly. No. 3044 is the main supporting clamp. Both types available in a wide range of sizes. Fastened with 3 different types of SPEED NUTS as illustrated. Write for bulletin No. 157 with complete information and samples.

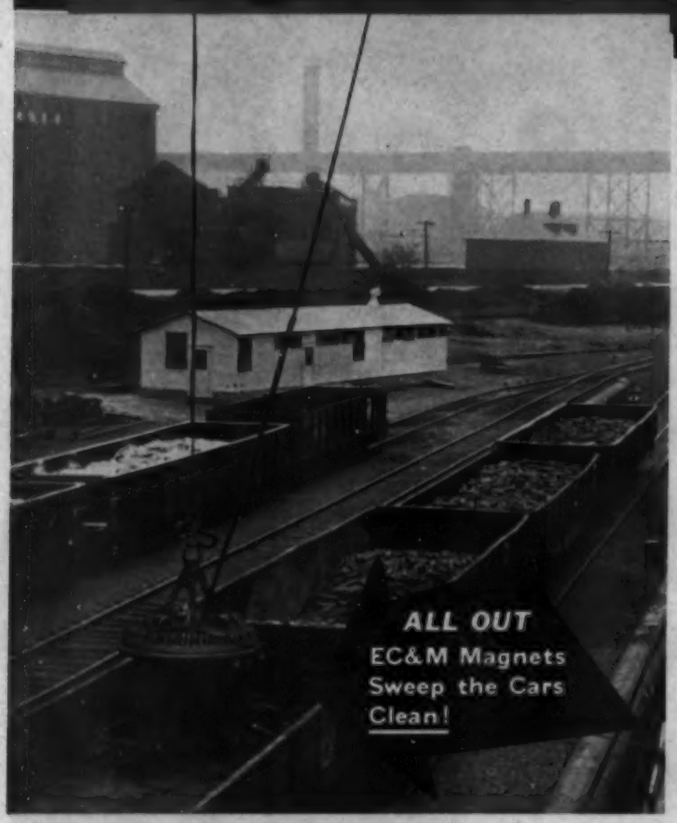
TINNERMAN PRODUCTS, INC.
2039 Fulton Road Cleveland, Ohio
IN CANADA: Wallace Barnes Co., Ltd., Hamilton, Ontario
IN ENGLAND: Simmonds Aerocessories, Ltd., London

Speed Nut System (PATENTED)

OVER A BILLION IN USE ★ ★ OVER 1,000 SHAPES AND SIZES

EC&M MAGNETS AND MAGNET CONTROLLERS HAVE A REPUTATION FOR FAST HANDLING

and Live up to it!



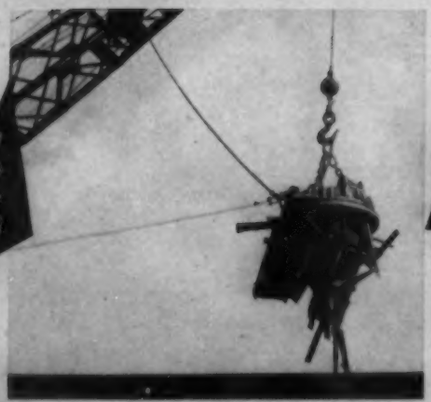
REGARDLESS of their tough assignments today—frequent lifts and long hours of operation—EC&M Magnets with Automatic-Discharge Magnet Controllers are ***helping move more scrap at lower cost than ever before.***

They offer you:

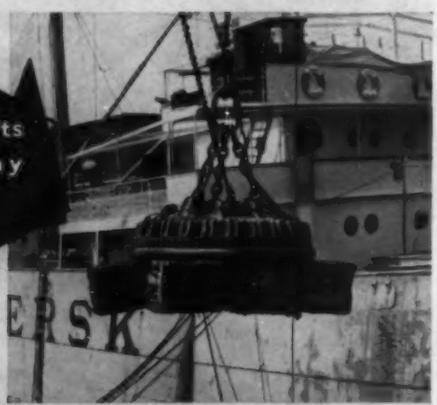
1. Ribbed magnet-case for high-radiating and maintained lifting capacity in all-day service.
2. ***Quickly-adjustable*** controller to suit load, voltage, size of magnet, etc.
3. Power contactor of ***Line-Arc*** design.

Fast handling, substantial savings are yours with EC&M Magnet Equipment. Ask for 18-page amply illustrated Bulletin 900AD.

Quick Release of Load Cuts down Time between Trips!



Good Lifts All Day Long!



THE ELECTRIC CONTROLLER & MFG. CO.

2700 E. 79th STREET — CLEVELAND, OHIO

EC&M Ribbed Case Magnets

RIBBED FOR STRENGTH . . . RIBBED FOR BIG CAPACITY OPERATION

On the fighting fronts . . .

In machine gun and machine-gun mount, Bethlehem Carbon Bars are right up with the fighting men of the United Nations. As hot-rolled rounds, as free-machining steel and as carbon forging billets, Bethlehem Carbon Steels are the material for dozens of parts of guns and gun mounts. Carbon steel bars are moving in large tonnages from Bethlehem plants to factories producing not only guns but virtually every kind of equipment used in modern warfare.

Bethlehem Carbon Bars

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

NEW CATALOG

CINCINNATI
PRESS BRAKES
THE CINCINNATI SHAPER CO.
CINCINNATI, OHIO, U. S. A.
Press Brake "Tools"
TONS PRESSURE REQUIRED TO PUNCH MILD STEEL PLATE
Bending and Punching Charts
U-BEND DIES
Lots of Dies and how to use them

64 PAGES

The new comprehensive, heavily illustrated Cincinnati Press Brake Catalog brings you up to date on today's wide application and development of the modern Press Brake.

THE CINCINNATI SHAPER CO.
CINCINNATI, OHIO, U. S. A.

Please send me the new 'B-1' Department ST Cincinnati Press Brake Catalog.

THE CINCINNATI SHAPER CO.
CINCINNATI, OHIO

Name _____

Company _____

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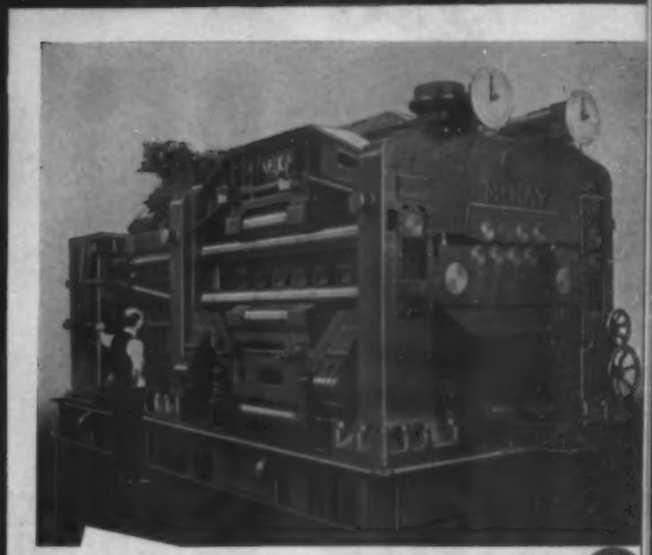
McKAY

1. The McKay Heavy Duty Roller Leveller.
2. The Budd-McKay Processing Machine.
3. McKay Heavy Duty Backed-Up 4-Hi Plate Leveller.
4. Backed-up Roller Leveller.

1



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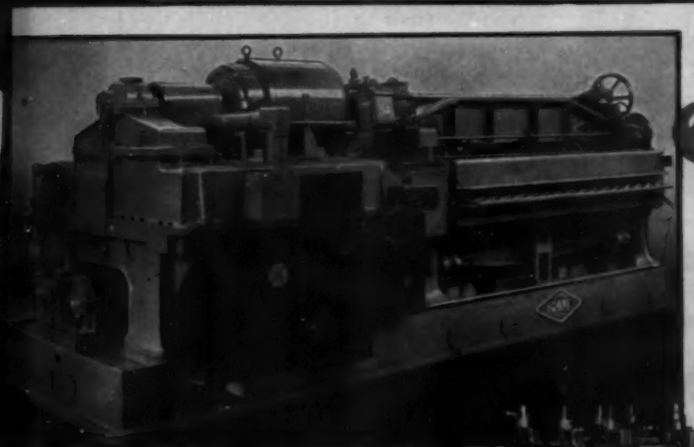


2

McKAY
McKROMETER
ADJUSTMENT

4

5. McKay Electric Tube Welder.

5

The McKAY MACHINE Company
ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT
YOUNGSTOWN, OHIO
ASSOCIATED COMPANY
The WEAN ENGINEERING CO., Inc. • WARREN, OHIO

Behind the Scenes with STEEL

Two-Way Service

■ Down in Washington throughout the War Production Board and the Office of Price Administration each Monday morning brings to the busy desks of dozens of top men a condensed, easily-read report on America's No. 1 war production industry. It gives them quickly a picture of technical progress in the industry, the effects of new priorities and allocations, the tempo of production, the market trends, the personnel changes, and the new ideas being put to use to speed war production now—when it's needed most.

Yet this service is not confidential, nor is it expensive. Simultaneously throughout industry over 8500 manufacturing plants, accounting for well over 90 per cent of the war production of the country, are receiving the same report. The top executives and production officials of these plants fit it into their day-to-day work, keeping informed accurately on how to operate under war regulations, how to produce more, how to conserve materials, how to train green men, and how to save time.

STEEL's editors, fully conscious of the importance of this two-way information service, will continue as they have done for many months without fail to give you the very best and most complete job it is humanly possible to do.

Washington Readers

■ Here, for example, is what J. Howard Somerville, Chief, Materials Section, Aircraft Branch, WPB, writes:

I was a regular subscriber for many years and during that time I found STEEL to be a valuable source of current information. Under present conditions here in Washington, I find STEEL is even more valuable, since it presents a concise digest of the tremendous volume of important information which is impossible for me to secure in any other way. It enables me to keep abreast of current developments without being forced to take time to review a mass of publications.

Harvey A. Anderson, Chief, Conservation and Substitution Branch, Bureau of Industrial Conservation, WPB, this week also writes:

I am using your excellent coverage of the metals situation as my chief source of outside contact with the repercussions of the War Production Board program.

And from OPA, Dexter A. Tutein, Iron and Steel Products Price Division, says:

STEEL is a great help to us in our work here and is read regularly with much interest.

Minute Messages

■ Executives and personnel managers who have the task of keeping efficiency and morale at a high level on war production no doubt will be interested in a new service offered by the Jaqua Co., 101 Garden street S. E., Grand Rapids, Mich.

This company has available a series of *Minute Messages*, which provide brief, inspiring, patriotic thoughts. The Messages may be secured on a weekly, or biweekly schedule for attaching to checks, placing in pay envelopes or mailing to the homes of employes.

Gadgeteers Note

■ If you have any good inventions lying around in the back of your mind, it may pay you to get in touch with Albert G. Burns, Alameda, Calif., who modestly signs himself *The Nation's Gadget Chief, Inventors of America*. If they aren't too Rube Goldbergish he'll put them into production for you for a nominal 15 per cent.

Special Issue

■ A. F. "Charlie" Davis, vice president, Lincoln Electric Co., week before last took a sudden trip to the hospital for an appendectomy and lipoma removal. Charlie announced just before he left that he was going to Shangri-La for the vacation he'd been talking about for so many years but it turned out to be the Hanna House in Cleveland.

When the truth was known, Charlie found himself on the receiving end of a pleasant surprise. *The Davis News*, a full-sized newspaper issued by the employes with the co-operation of a Cleveland daily, reached Charlie in his Shangri-La with a screaming headline, "Davis Found In Secret Hideout", and the story of how his Scotty, Sandy MacDavis, had traced the fugitive to a swank hideaway suite. They did it up right with all kinds of stories about Charlie spread all over the front page and you can bet your boots he won't forget it for a long time.

Being Used

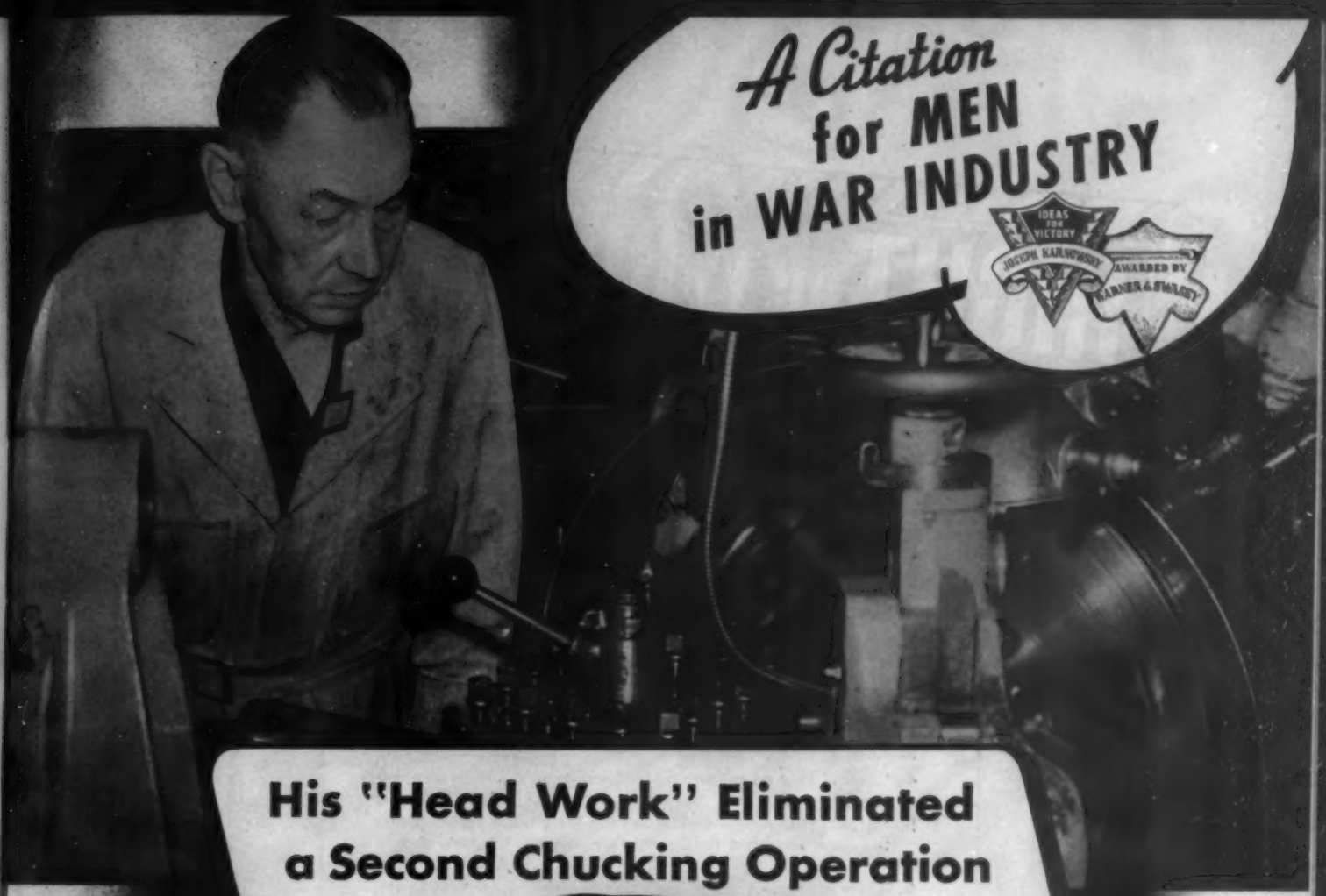
■ Copies of STEEL's Ordnance Production Handbooks—over 10,000 of which have gone out to metalworking plants and to the Army and Navy—certainly aren't gathering dust on library shelves. Typical is this letter from Douglas S. Reveley of the General Railway Signal Co., Rochester, N. Y.

Fred King, engineer in the heat treating department, has circulated his copy of Modern Shell Production among so many of his interested employes that it is somewhat the worse for wear. We consider this edition a particularly fine piece of work and need a fresh copy.

All three handbooks are still available at $3.00 for the set, or $1.50 for Modern Shell Production, $1.00 each for Modern Small Arms and Modern Gun Production.

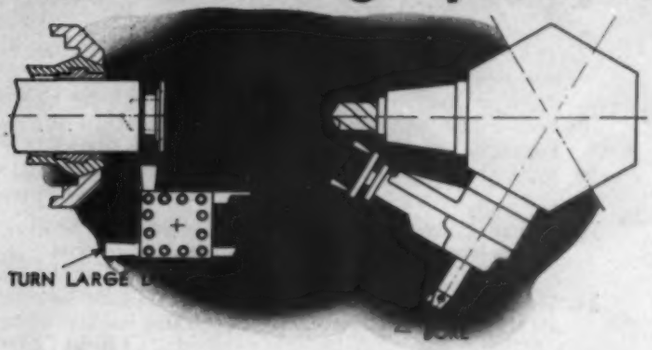
Vol. 110, No. 24, June 15, 1942, issue of STEEL, published every Monday at Cleveland, O. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

Buy a War Bond—Today!



A Citation for MEN in WAR INDUSTRY

His "Head Work" Eliminated a Second Chucking Operation



Joe Karnowski mans a turret lathe in the Strut Department of *Bendix Aircraft,* South Bend, Ind. Along came a complicated collar job with the routing book calling for two chuckings. But operator Karnowski, like thousands of other skilled mechanics, thinks beyond routine work sheets. By rearranging the tooling, he was able to finish the work in *one* chucking, saving valuable time otherwise spent in rechucking for a second operation. The finished piece is also more accurate because in a single chucking all faces are square and the hole concentric. We are proud to present operator Karnowski with a gold victory pin for his contribution to "Ideas for Victory".

Hundreds of resourceful operators send their "Ideas for Victory" to be published in "Blue Chips", a newsy shop bulletin sent free to turret lathe operators' home addresses. Make sure *your* operators—old timers and learners—are on the list to get "Blue Chips". They'll enjoy it and profit through reading it. Write Warner & Swasey, Cleveland, Ohio.

Idea
VICTO
...from the Produ
behind the Firing

YOU CAN TURN IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY

WARNER & SWASEY
Turret Lathes
Cleveland

RIGHT or WRONG?

. . . TEST YOUR KNOWLEDGE OF "ACORN" DIES

"*Acorn*" Dies are furnished in 5 different sized blanks.

Regular "*Acorn*" Die holders for screw machines that reverse die or rod automatically.

HERE are 12 questions about "*Acorn*" Dies. Out of 7 tool foremen who recently tackled them, only one was able to score 100%. How about you? Don't peek at the answers in the lower right corner till you've checked your knowledge.

1. "*Acorn*" Dies can be used on all makes of hand or automatic screw machines, turret lathes, bolt cutters, drill presses, etc. ☐ Right ☐ Wrong
2. "*Acorn*" Dies can only be used on fixed centers. ☐ Right ☐ Wrong
3. "*Acorn*" Dies are adjustable. ☐ Right ☐ Wrong
4. "*Acorn*" Dies do not require lead screws on machines on which they are used. ☐ Right ☐ Wrong
5. "*Acorn*" Dies can be used on any machines which reverse either the die or rod when the desired thread length has been cut. ☐ Right ☐ Wrong
6. There is only one size of "*Acorn*" Die blank for all thread sizes. ☐ Right ☐ Wrong
7. There are standard holders which permit "*Acorn*" Dies to be used with "button," spring or floating die holders. ☐ Right ☐ Wrong
8. Smaller than ordinary "*Acorn*" Dies can be used with a given holder. ☐ Right ☐ Wrong
9. Each size of "*Acorn*" Die holder is available with only one size shank. ☐ Right ☐ Wrong
10. Genuine "*Acorn*" Dies have an exclusive patented "heel" on the cutting lands that prevents tearing threads on reversal. ☐ Right ☐ Wrong
11. "*Acorn*" Dies are so uniform in size that they can be removed for sharpening, or changed without checking machine set-up. ☐ Right ☐ Wrong
12. A special fixture is needed to hold dies for sharpening. ☐ Right ☐ Wrong

For years "*Acorn*" Dies have hung up amazing records on various types of production work. Consider them for any job where dies seem to wear out rapidly.

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASSACHUSETTS
DETROIT PLANT: 2102 West Fort St.
WAREHOUSES in
New York, Chicago and Los Angeles
In Canada: GREENFIELD TAP AND DIE CORP. OF CANADA, LTD., GALT, ONT.

Releasing "*Acorn*" Die holder for hand screw machines.

"*Acorn*" Die Adapter, for button, spring or floating holders.

This is one of a series of advertisements published by Greenfield Tap & Die Corporation to help users get greater production from their small tools in these critical times, through making useful facts more widely known

GTD GREENFIELD
TAPS • DIES • GAGES • TWIST DRILLS • REAMERS • SCREW PLATES • PIPE TOOLS

1. Right 5. Right 9. Wrong
2. Wrong 6. Wrong 10. Right
3. Right 7. Right 11. Right
4. Right 8. Right 12. Wrong

As changing consumer demands impose more exacting requirements upon production, users of Weirite Tin Plate and allied steels find the Weirite trade-mark a symbol of continuously satisfactory quality . . . a quality that assures better performance on *your* production line, and keeps Weirton in its unchallenged position as the world's largest independent tin plate producer.

LIST OF PRODUCTS

Bars . . . Angles . . . Structurals . . . Piling . . . Hot and Cold Rolled Strip . . . Hot and Cold Rolled Sheets . . . Galvanized Sheets . . . Long Terne Sheets . . . WEIRITE Cold Reduced Tin Plate . . . Terne Plate —Special Coated and Roofing Ternes . . . Tin Mill Black Plate . . . Lacqured Tin Plate and Black Plate.

WEIRTON STEEL COMPANY—WEIRTON, WEST VIRGINIA

Sales Offices in Principal Cities

division of NATIONAL STEEL CORPORATION

Executive Offices, Pittsburgh, Pa.

How to prolong the life of Pickling Equipment

1. **KEEP PICKLING TANKS TIGHT** . . . and thus prevent corrosion of tie-rods by leaking acid.

2. **DON'T LEAVE UNLOADED CRATES IN ACID** . . . because it shortens their life.

3. **WASH OFF HANDLING EQUIPMENT** . . . even when out of service for only a brief period.

These instructions apply to equipment of any metal, including Monel

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street **New York, N. Y.**

★ ★ ★

★ ★ INCO Nickel Alloys in the War Effort ★ ★

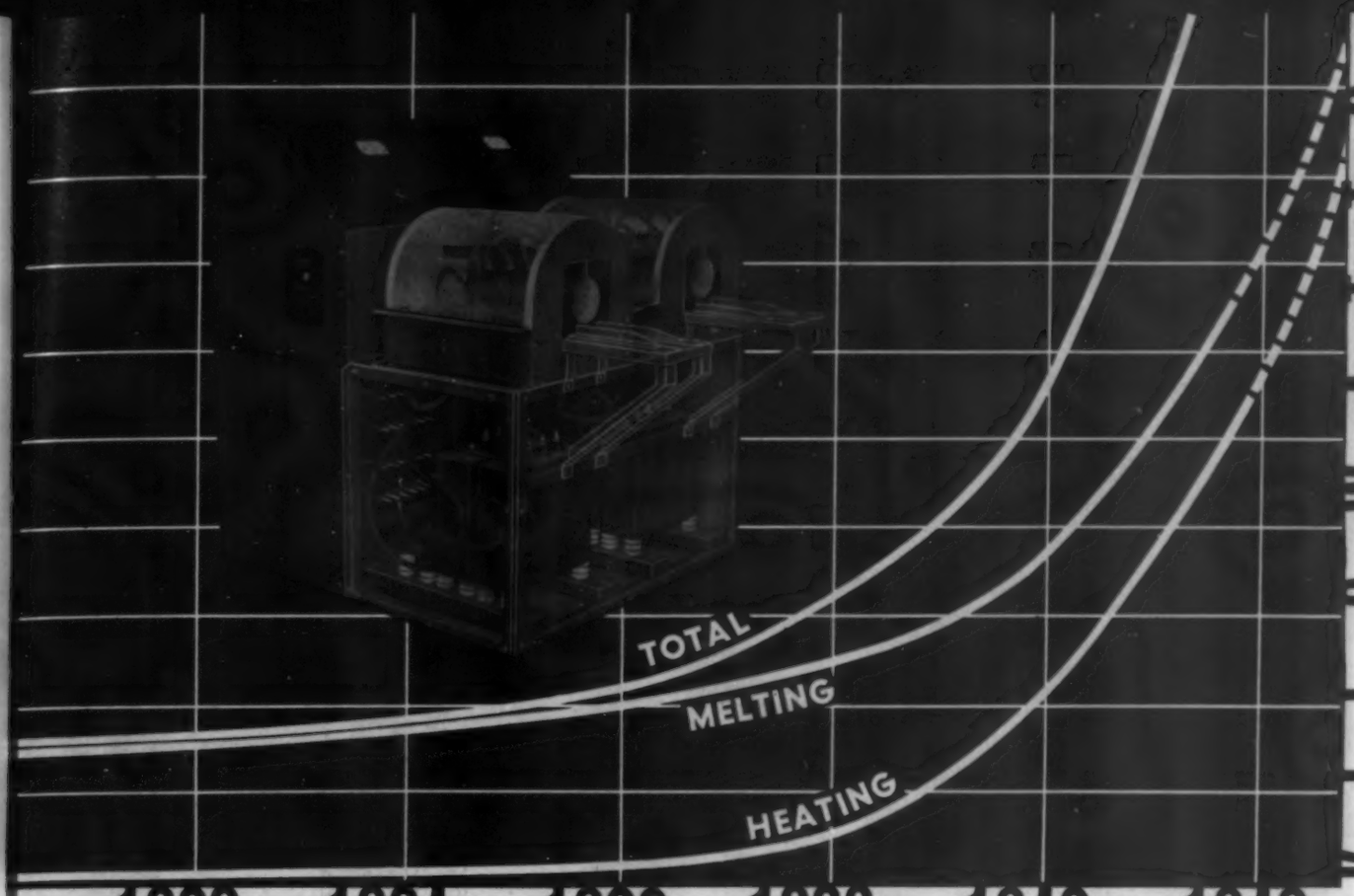
With the Nation at war, every pound of Nickel, Monel and Inconel that expanded facilities can produce is urgently needed for vessels of the Navy, mechanical and chemical equipment for the Army, vital parts of Aircraft, and for Chemical, Petroleum, Steel and other essential industries. As part of the all-out war effort the International Nickel Company will continue to report for the benefit of such users information concerning the selection, fabrication and use of Nickel and Nickel Alloys.

INCO NICKEL ALLOYS

MONEL* • "K" MONEL* • "S" MONEL* • "R" MONEL* • "KR" MONEL* • INCONEL* • NICKEL • "Z" NICKEL*

Sheet . . . Strip . . . Rod . . . Tubing . . . Wire . . . Castings

*"Monel" and other trade-marks which have an asterisk associated with them are trade-marks of The International Nickel Company, Inc.



NOW...

HIGH FREQUENCY HEATING IS HERE TO STAY

The unusual flexibility of Ajax-Northrup High Frequency Equipment may easily be its greatest asset, for you can quickly convert from heating to brazing or melting at any time for a fraction of the original investment.

High frequency heating is being greatly accelerated by the combination of current events. Quantity production floating on conveyors provides an ideal setup. The urgency for speed, maintenance of uniformity and conservation of man power are the deciding factors.

In fact, although little heating equipment had been installed previous to 1936, the sales curve of Ajax-Northrup High Frequency Heating Equipment will soon cross that of the melting equipment which has been used extensively since 1918.

Continued growth is assured because high frequency heating covers the range of advantages from high-speed production to top quality and competitive costs.

50

AJAX HIGH FREQUENCY FURNACES

NORTHRUP AJAX ELECTROTHERMIC CORPORATION, AJAX PARK, TRENTON, N.J.

ASSOCIATE COMPANIES: THE AJAX METAL CO. *Non-Ferrous Ingot Metal for foundry use.*
AJAX ELECTRIC FURNACE CORPORATION. *Ajax-Wyatt Induction Furnaces for melting.*
AJAX ELECTRIC CO., Inc. *Ajax-Hultgren Salt Bath Furnace and Resistance Type Electric Furnaces.*

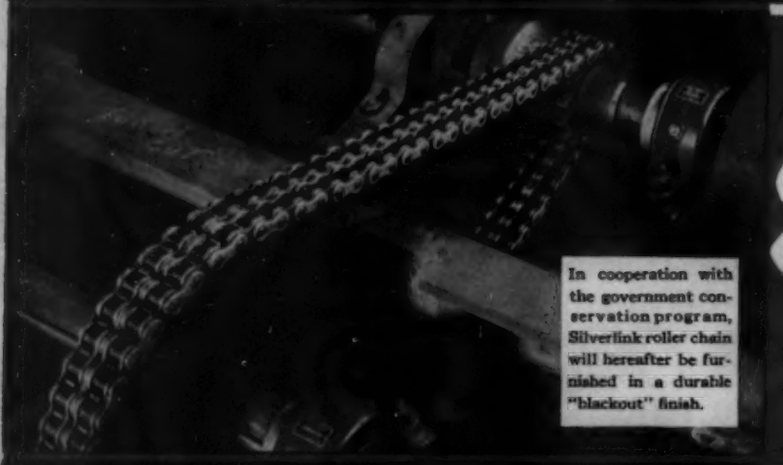
In cooperation with the government conservation program, Silverstreak silent chain will hereafter be furnished in a durable "black-out" finish.

Link-Belt SILVERSTREAK Silent Chain Drives

Because of its positive, tooth-to-tooth contact, this drive cannot slip. It delivers every R.P.M. of the motor to the machine and provides smooth, quiet and dependable service for years at highest efficiency. For maximum production, equip your machines with Link-Belt Silverstreak Silent Chain Drives!

Link-Belt P.I.V. GEAR Variable Speed Transmission

With this unit, speed changes can be made instantly and accurately by a simple twist of the wrist without stopping the machine. Thus the predetermined, ideal speed for any operation can be obtained quickly with split-second accuracy. Made with a positive chain drive to transmit the power, this unit maintains speed accurately.



In cooperation with the government conservation program, Silverlink roller chain will hereafter be furnished in a durable "blackout" finish.

Link-Belt SILVERLINK Roller Chain

High strength, great flexibility, accuracy, smoothness, stability and long life are features of Silverlink roller chain which assure highest efficiency in power transmission and conveying service. Silverlink is used on thousands of applications throughout industry and its dependable performance has established it as the "Standard of Roller Chain Quality."

Link-Belt Precision-Built SPEED REDUCERS

Link-Belt offers a complete service on speed reducers. Making a full line, including herringbone gear, worm gear and motorized helical gear types in a wide range of sizes and ratios, the answer to any speed reducer problem can be given quickly and without bias.

4 Good Soldiers

in the Battle for Production

LINK-BELT is ready to help Design Engineers and Production Men with their power transmission problems

The machines you are operating today are going to determine the future of America. They not only have to be good performers—they've got to do more and do it faster than ever before.

Now, more than ever, is the time to see that they are equipped with the most efficient and the most modern means of positive power transmission and accurate speed control. Link-Belt can help you, for nowhere else can you find the accumulated knowledge and experience on all phases of power transmission that is possessed by Link-Belt Engineers. They are at your service without obligation. Send for Binder No. 2100. It contains eight complete catalogs bound as one book, covering the complete Link-Belt line of Positive Drives—Silent and Roller Chain Drives, Speed Reducers, P.I.V. Gear Variable Speed Transmissions. "Friction Fighter" Book No. 1775 contains 88 pages of engineering data, dimensions, weights, list prices, etc., on the famous Link-Belt line of ball and roller bearing units.

LINK-BELT COMPANY

Indianapolis, Ewart Plant, 220 S. Belmont Ave. 8888-A
Chicago, Philadelphia, Atlanta, Dallas, San Francisco, Toronto
Branch offices, warehouses and distributors in principal cities

Leading Manufacturer of Mechanical Transmission Equipment—Silent and Roller Chains . . Speed Reducers . . Speed Variators . . Roller, Ball and Babbitted Bearings . . Collars . . Couplings . . Base Plates . . Take-Ups . . Clutches . . Gears . . Sprockets . . Hangers . . Shafting . . Pulleys, etc.

SOME OF THE MANY FACTORS

Governing Proper Choice of Oil Seals

There are certain factors which must be considered in making an intelligent choice of oil seals for any given application. They are:

1. *Size* and finish of Shaft on which the seal will operate.

2. *Space Limitations,* if any, in the housing which carries the seal.

3. *Shaft Speed:* Oak Leather packing members are suitable for speeds up to 750 FPM., Sirvis Leather for speeds from 750-2000 FPM.

FPM = Shaft Diameter x RPM x .26

4. *Operating Temperature:* Oak Leather packing members suitable for temperatures up to 140° F., Sirvis Leather from 140-200° F., Sirvene Synthetic from 200-300° F., High Temperature Sirvene Synthetic up to 400° F.

5. *Fluids:* Leather packing members for contact with oil or grease, Sirvene Synthetic for acids, alkalis, and solvents incompatible with leather.

6. *Operating Pressure:* Pressure of lubricant on the seal or the difference in pressures on the two sides of the seal.

7. *Shaft Motion:* Rotary or reciprocating.

8. *Foreign Matter:* Concentration of air or fluid born abrasive dust or moisture.

Chicago Rawhide engineers have had a lifetime of experience in dealing with oil sealing problems of all kinds. Consult them.

CHICAGO RAWHIDE MANUFACTURING COMPANY

1208 ELSTON AVENUE • CHICAGO, ILLINOIS

64 Years Manufacturing Quality Mechanical Leather Goods
Exclusively and now Sirvene Synthetic Products

PHILADELPHIA • CLEVELAND • NEW YORK • DETROIT • BOSTON • PITTSBURGH • CINCINNATI

"PERFECT" Oil Seals PATENTED

Control...

THE CRITICAL FACTOR IN BATTLESHIP OR STEEL CASTING

THOUSANDS of tons of steel hurtle forward when the battleship moves into action... heavy guns and thick armor plate give and take mighty blows... yet victory or defeat are determined by delicate instruments of *control.*

Grasp that principle of control as the critical factor ... and you'll begin to see why Lebanon's job planning is vitally important to users of steel castings. Lebanon's Operating Department carefully studies designs (preferably, before patterns are made) to be sure that they conform with tested steel foundry practice. If design improvements are indicated, Lebanon suggests them to the customer.

Patterns are then made and checked to blueprint for dimensional correctness. Next the job is planned for production, with consideration given to the location and size of feed heads... methods of rigging and gating. This helps to assure sound castings.

If advisable, sample castings are made to be checked dimensionally... then inspected by destructive or non-destructive methods for soundness of section before being released for production.

There is a premium on quality in steel castings and Lebanon pays that premium in the form of control at every possible point. That's why Circle L Castings are chosen to guard the integrity of such products as Andale Strainers and Mason-Neilan Regulators.

Lebanon metallurgists are studying future applications for alloy and carbon steel castings of controlled quality... and are ready to discuss significant developments with forward looking organizations.

LEBANON STEEL FOUNDRY · LEBANON, PENNA.

ORIGINAL AMERICAN LICENSEE GEORGE FISCHER 'SWISS CHAMOTTE' METHOD

LEBANON *Stainless and Special Alloy* **STEEL CASTINGS**

McKAY ELECTRODES . . .
FOR STRENGTH IN ACTION!

A ship of the line welded with McKAY Electrodes becomes an *integrated, seamless* hull of continuous steel, with no rivets to burst . . . harder to disable . . . a tough customer in battle!

As McKAY Electrodes SERVE in ship building they also SAVE! Save by materially reducing deadweight . . . save man-power . . . save ship ways by cutting building time in half . . . save millions of rivet holes . . . save vital steel!

The McKAY Company's greatly expanded capacity has been "enlisted for the duration" . . . to SERVE and SAVE wherever the superiority of its "researched" electrode line best functions in the nation's war effort.

THE McKAY COMPANY · PITTSBURGH, PA.

PACIFIC COAST SALES OFFICES: 125 S. Santa Fe Ave., Los Angeles · 100 Howard St., San Francisco

The McKay line includes regular carbon steel, stainless, and alloy steel electrodes for every welding purpose. Literature on request.

The McKay Company was among the first honored with the coveted Navy "E" award for excellence in fulfilling Naval Ordnance contracts.

McKAY WELDING ELECTRODES

AND INDUSTRIAL, MARINE AND AUTOMOTIVE CHAINS

3 REASONS for FASTER QUENCHING SPEED PLUS STABILITY

1. HOUGHTO-QUENCH "G" is an oil made solely for quenching; its make-up includes a percentage of wetting-out agent to speed spreading over metal surfaces.
2. HOUGHTO-QUENCH "G" embodies a further ingredient high in heat absorption, enabling transfer of heat more rapidly from the metal.
3. HOUGHTO-QUENCH "G" contains a patented stabilizing agent which minimizes oxidation or fractional distillation of the oil in service.

You want fast quenching speed—and you get it with Houghto-Quench "G." But that's not all: you also get a lasting power, a stability that keeps Houghto-Quench "G" the same, month after month. You get freedom from sludging; no clogging of cooling systems. You get the proper fire, flash and viscosity. And finally, you get the services of men trained in heat treating who can help you greatly in the many new problems you face today.

For those reasons, insist on HOUGHTO-QUENCH "G" for quenching munitions and war materials.

Products for War Manufacturing
Carburizers
Blackening Salts
Drawing Compounds
Rust Preventives
Specialized Lubricants
Heat Treating Salts
Metal Cleaners
Pickling Inhibitors
Core Oils
Hydraulic Oils

E. F. HOUGHTON & CO.
PHILADELPHIA
Chicago - San Francisco - Detroit

HOUGHTO-QUENCH "G"

POWER...and still more POWER for the Navy

These reduction gear units—important links between motor and propeller in naval vessels—are made of Cast Steel.

Steel Castings are used for this purpose for a very sound reason—they are the quickest and least costly way of securing the strength, the stamina, the precision and the wearing qualities needed for this vital job.

It is significant that the maker of these parts has just been asked to quadruple his output!

There are no adequate substitutes for Steel Castings in thousands of applications—for both armament and peacetime goods—no other materials that do the work quite so well, or that can be turned out so quickly at such low cost.

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But you'll find your steel foundryman a resourceful man, anxious to help solve your problem. Or you may write to Steel Founders' Society, 920 Midland Building, Cleveland, Ohio.

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shipments are now the rule on this machine.

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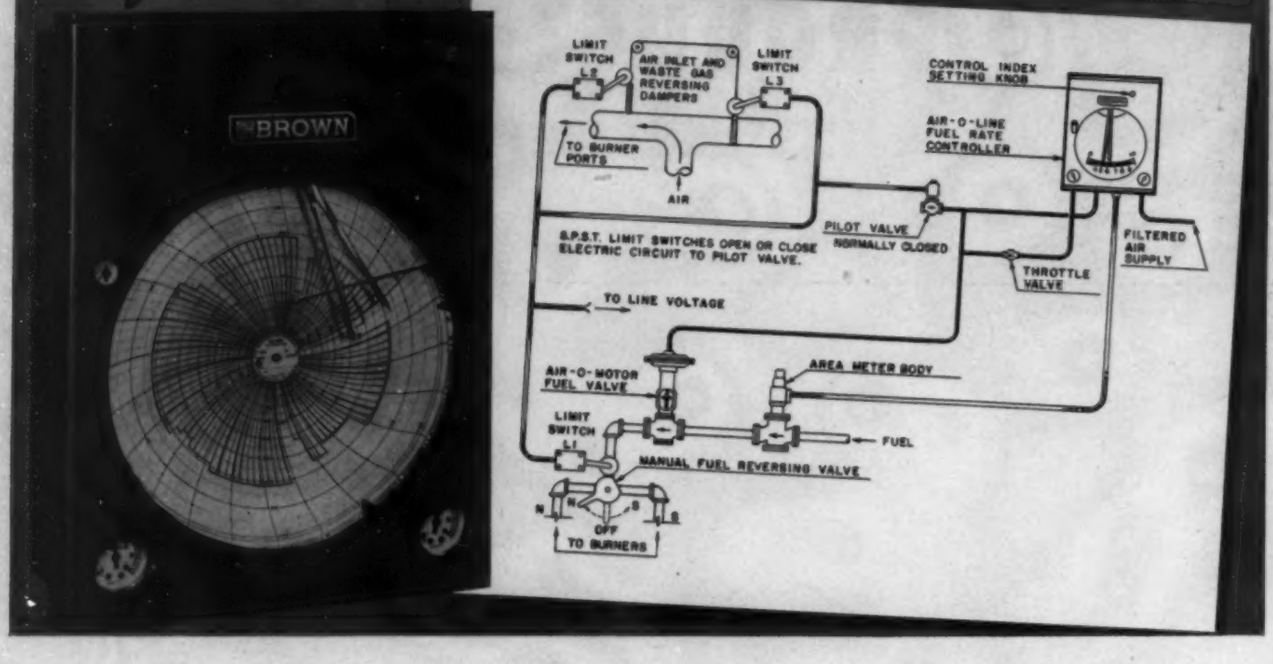
HORIZONTAL BORING, DRILLING AND MILLING MACHINES • SHAPERS • PLANERS

Ideal Fuel-Flow Control System for REGENERATIVE FURNACES



IF "all out" production orders have you pushing for greater tonnage—efficient furnace control is essential.

You can rely on the above Brown Pneumatic Fuel-Flow Control System to boost production by controlling desired fuel-flow at a constant equal rate to each end of furnace, irrespective of variations in fuel and steam pressure, temperature, or inequalities in the burner piping.

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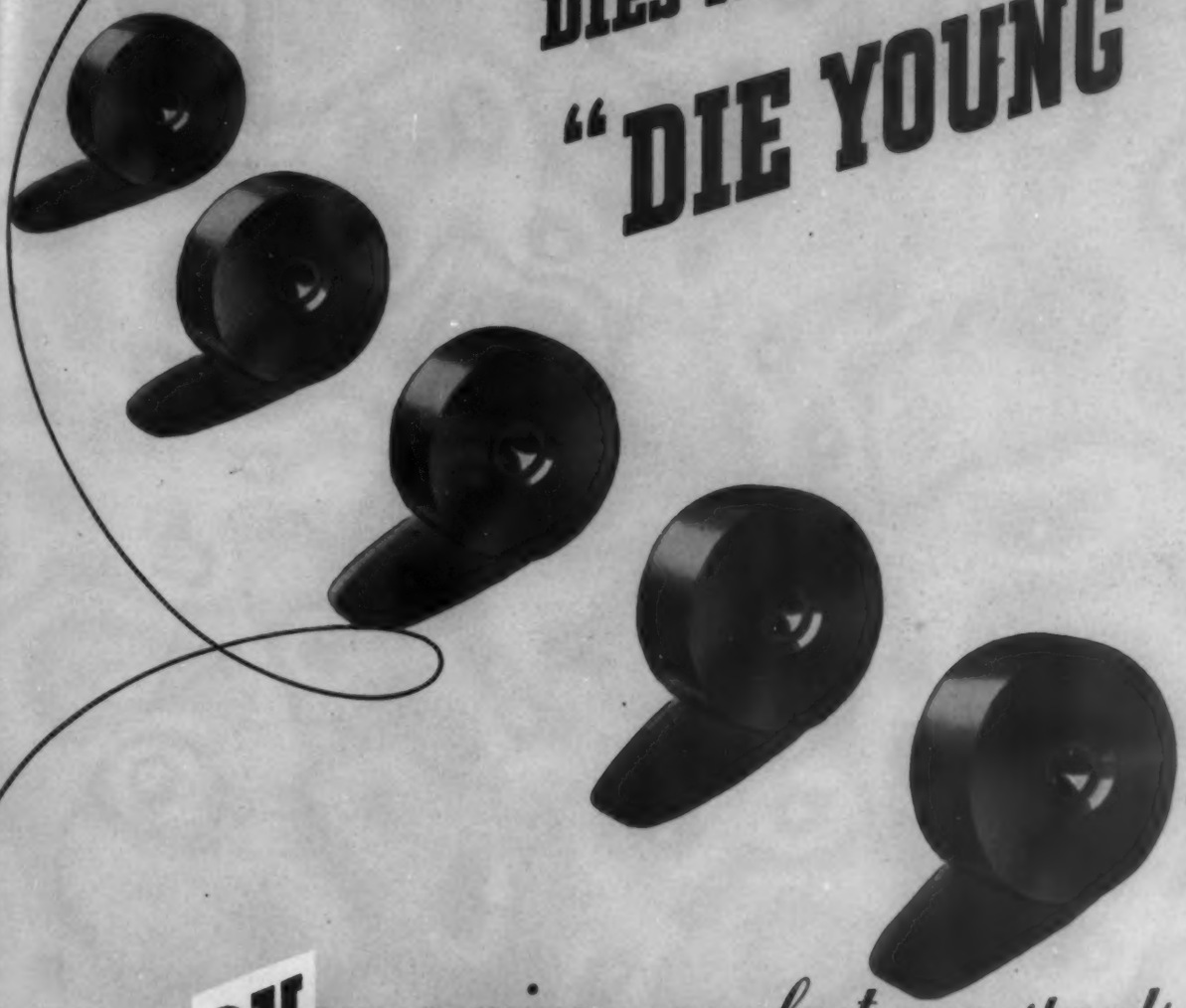

How a wire manufacturer speeds output and saves by using a Pennsalt Cleaner

"Our wire drawing dies aren't lasting as long as they should," decided the production men in a leading steel mill. "And tungsten carbide dies are getting harder to replace, now that expert die makers are scarcer than hen's teeth."

What to do?

A Penn Salt representative helped find the answer . . . better cleaning of the wire before drawing. After studying the problem, he suggested using the one of our series of Pennsalt Cleaners best suited for this job.

Success! Tungsten carbide dies in this steel mill now last 15-20% longer. There is less scrap loss and less scratching of wire. Rusty wire, requiring reprocessing, has been practically eliminated by dipping the wire first in a Pennsalt Cleaner solution and then in lime, before drawing. And, in addition, cleaner costs have been substantially reduced by comparison with the former metal cleaner used.

Most important of all, the longer die life, lower scrap loss and elimination of rusty wire . . . achieved with the aid of this Pennsalt Cleaner . . . helped *speed up production* of wire rope and other wire products vitally needed for Defense.

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PENNSYLVANIA SALT MANUFACTURING COMPANY

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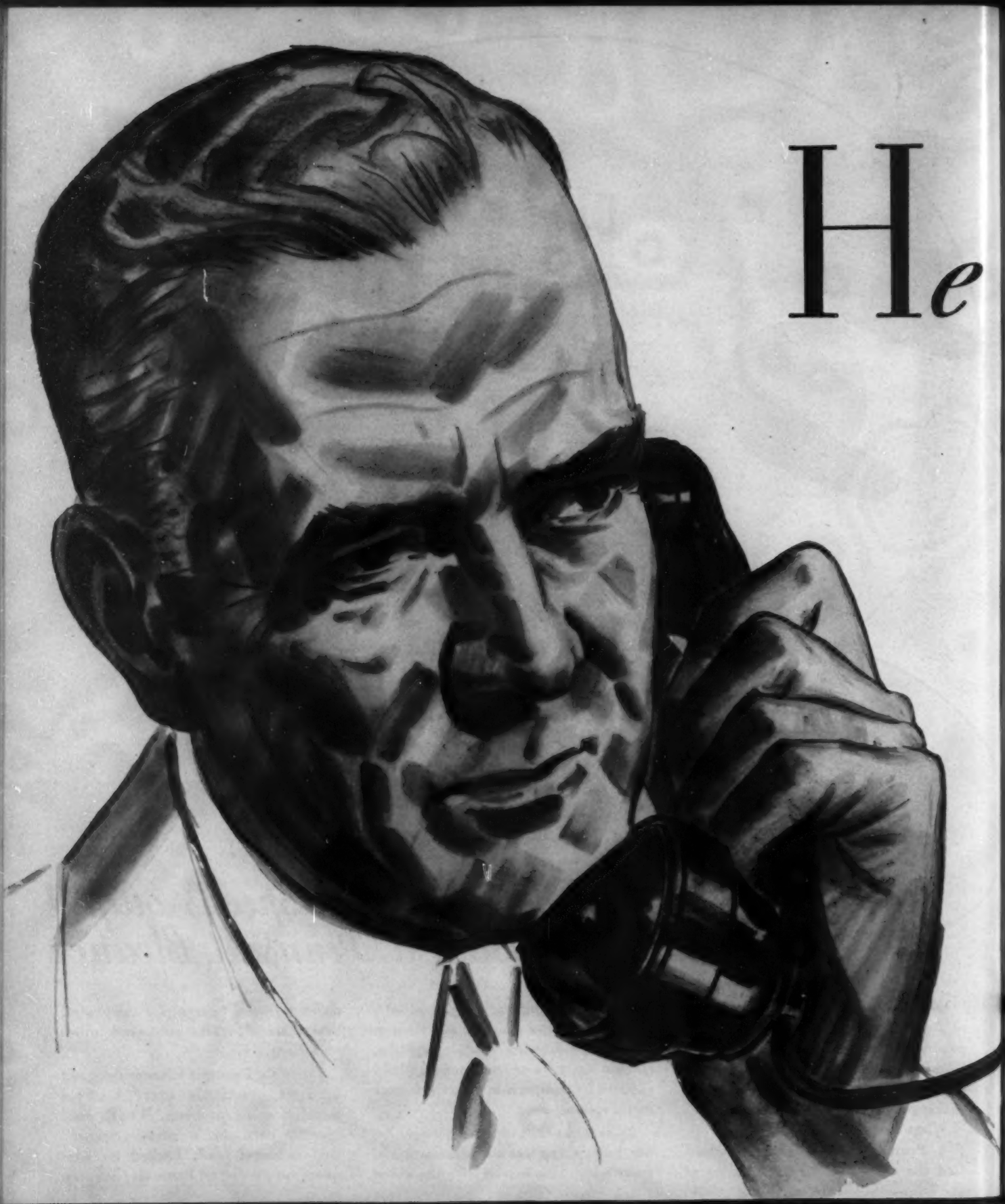

CALL YOUR *Republic*

never stops trying to help you

CALL YOUR REPUBLIC DISTRIBUTOR *FIRST*

Give him a chance to help you solve your steel supply problems. He's anxious to serve you—*and can, in many ways.* Due to *Production for Victory,* he may not be able to give you *all* the Republic sheets, pipe, bolts and nuts, cold finished bars and shafting, boiler tubes and electrical conduit you need, but *he won't stop trying.*

When you put your problem up to your Republic Distributor, he tackles it as if it were his own. For today, *your* worries are *his* problems and his business depends on his solving them. So, he has simply rolled up his sleeves and buckled down to the job of using all his facilities overtime to give you emergency service *now* when you need it most.

He still may be able to furnish you with small supplies for vital machine and plant maintenance, or enough to keep a war contract moving until your mill order arrives. If he can't, he will go the limit to get them for you. Often he can furnish other sizes or grades that will serve almost as well. He may be able to suggest ways to make your stocks go farther. He just never lets up in his effort to help you.

He's the kind of a man you *need* in this emergency, so always call your Republic Distributor *first.* To save valuable time, be sure to give him complete information on how you intend to use the materials and your priority rating. Republic Steel Corporation, Cleveland, Ohio.

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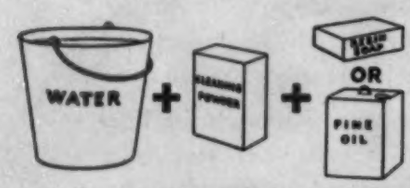
REPUBLIC STEEL
PRODUCTION FOR VICTORY

DISTRIBUTOR FIRST

How to increase the Life of your Oxy-Acetylene Welding and Cutting Hose . . .

Uninterrupted use of the oxy-acetylene process is vital to industrial maintenance and production. It is therefore reasonable to expect the continued manufacture of adequate amounts of oxygen and acetylene hose for use in the many essential applications of this process. However — as with any product made of materials subject to strict rationing — certain limitations on manufacture of hose, and restrictions on sale, are inevitable. It is therefore to the advantage of everyone to increase the useful life of all oxygen and acetylene hose in service.

1. ***Protect hose from oil and grease,*** as these cause rapid deterioration of rubber. If oil or grease does get on hose, remove with water and any commonly used cleaning agent supplied in powder form, such as "Oakite;" or with con-



crete floor cleaning powder. Addition of about 5 per cent pine oil or resin soap will facilitate cleaning. Do not use gasoline, kerosene, or any cleaner containing caustic soda or potash.

2. ***Avoid burning of hose*** due to careless use of blowpipes, or from permitting hose to contact hot objects.

3. ***Avoid kinks*** and undue abrasion or abuse when handling hose. Coil it—

don't drag it—when moving to new locations. If hose crosses the path of vehicles, protect it by planks.

4. ***Use short lengths of hose.*** Short lengths not only are more readily available, but are more easily protected from

damage. By inserting couplings in the ends of hose as illustrated, several short lengths can quickly be joined when required.

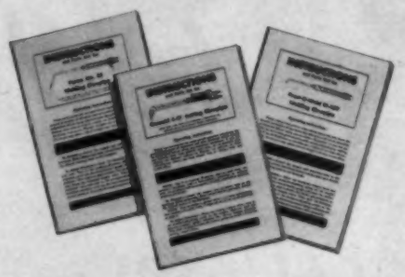
5. ***Test hose regularly over its full length*** by immersing it in water while

under operating pressure. Cut out leaky sections at once and rejoin the hose ends by using hose splices as shown above.

6. ***Test all hose connections for leaks*** by brushing on soapy water while the hose is under operating pressure. If leaks are found—or if hose ends are worn—cut the ends off back to sound

rubber and reassemble ferrules and nipples, as diagrammed above.

7. ***Operate blowpipes only at pressures recommended*** in the apparatus instruction book. Keep blowpipes in



good condition to avoid damaging flashbacks. Use oxygen and acetylene hose only for the purpose for which each is intended.

8. ***Purchase hose only when actually needed.*** Rubber deteriorates while on the shelf, with resultant shortening of useful life.

* * *

Send for Helpful Literature

The steps described here not only will conserve hose, but will conserve gas and contribute to the safe use of the oxy-acetylene process. Duplicate copies of the instruction booklets furnished with apparatus supplied by Linde are available without cost upon request. Also available is the helpful booklet, "Precautions and Safe Practices", which gives full instructions for setting up apparatus correctly. Write for the copies you need—today.

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Unit of Union Carbide and Carbon Corporation

30 East 42nd Street, New York UCC Offices in Principal Cities

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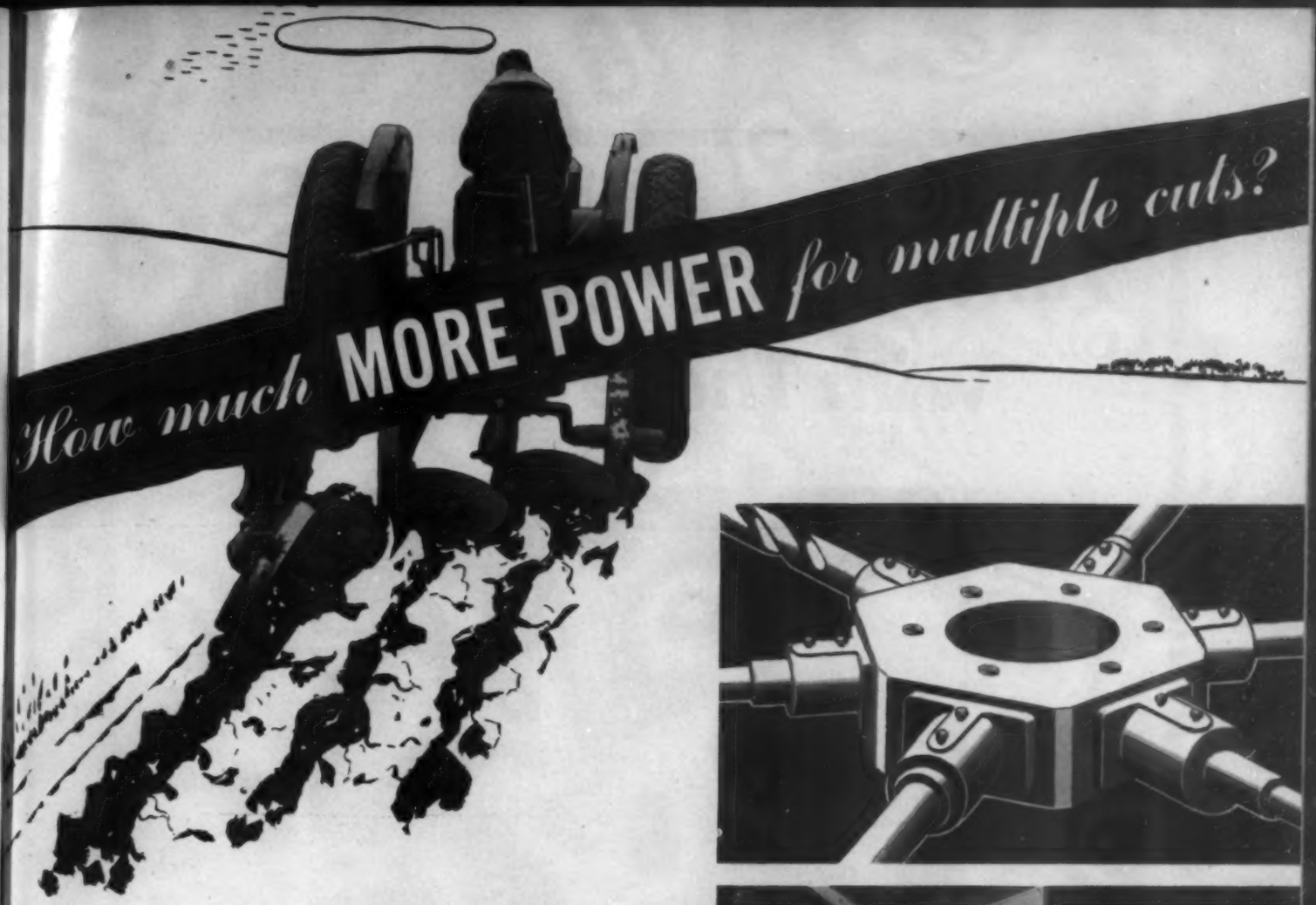
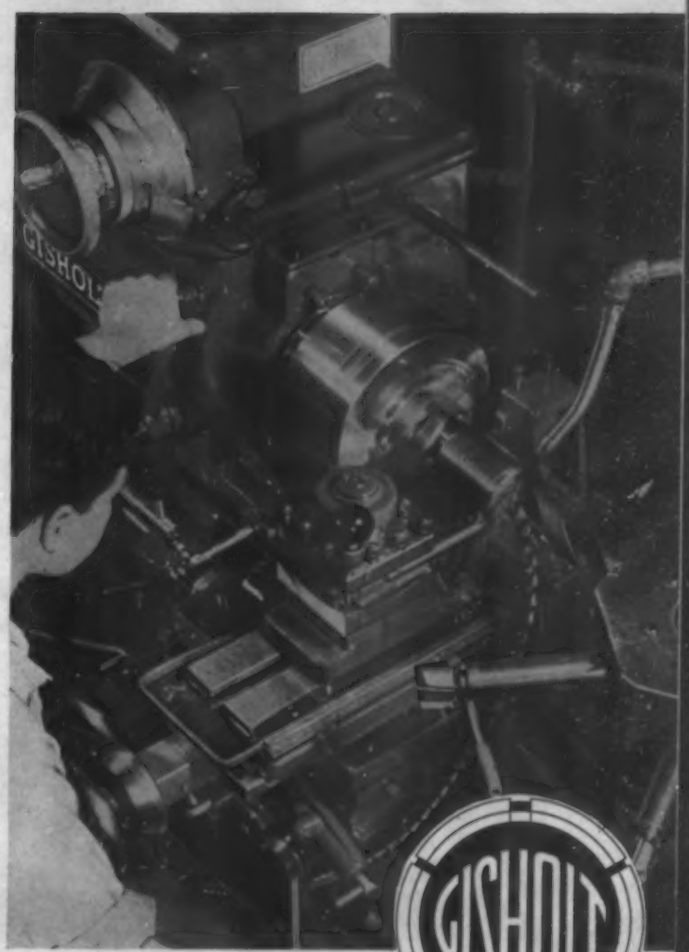
You Can Obtain Copies of this Advertisement For Distribution in Your Shops . . . or to Post on Your Bulletin Boards . . . Upon Request.





WHETHER you're turning soil or turning metal, you need that extra pull for extra tools. You may need two, three, or four times as much power. Or more.

To facilitate the multiple cuts that do so much to boost production, Gisholt Turret Lathes provide a complete range of twelve forward and reverse speeds—all in geometrical progression. Whatever your requirement to pull the heavier load at the most efficient cutting speed, you have power in abundance for it. Power delivered steadily, *smoothly*—without strain or vibration.

Simple controls and easy "handling" enable the operator to make the utmost of Gisholt power and speed.

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1217 East Washington Ave., Madison, Wisconsin

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GISHOLT

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America Fights the Clock with These Scales!

PRECIOUS minutes can be saved with modern Fairbanks-Morse Scales.

This scale, installed in a conveyor system, is weighing castings on the move. At the touch of a button castings are weighed without stopping and a printed record is made!

Use your priority to secure Fairbanks-Morse Scales that will not only save time *now,* but in years to come. Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Illinois.

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Samples, specifications for needed war work are available. See p. 30.

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WHERE *Precision* IS PRICELESS

YES, it's a comparatively small part —*a cylinder hold down stud*—only one of many threaded hardened pieces that go to make up the powerful engines of today's fighting planes . . . small but vital parts that must be *precision-machined* if they are to endure the stress that's unavoidable in modern airplane engines . . . this stud (with threads on both ends, tapered and straight, *precision ground* from the solid after heat treat) is typical of thousands of hardened parts being threaded on a production basis day and night for the aircraft industry . . . *on Ex-Cell-O thread grinding machines* . . . to the highest commercial standards of accuracy in size and finish.

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The modern precision thread grinder is an Ex-Cell-O accomplishment, introduced by Ex-Cell-O to American industry in 1935. There are nine styles of Ex-Cell-O Precision Thread Grinding Machines, covering an extremely wide range of work for both external and internal threads. Below is Ex-Cell-O Style 33 Automatic (used for production of precision threaded hardened stud shown above).

XLO

EX-CELL-O *means* PRECISION

Precision THREAD GRINDING, BORING AND LAPPING MACHINES, TOOL GRINDERS, HYDRAULIC POWER UNITS, GRINDING SPINDLES, BROACHES, CUTTING TOOLS, DRILL JIG BUSHINGS, PARTS

HIGHLIGHTING

this issue of STEEL

NEWS Control over the distribution and use of metals will be coordinated under the Production Requirements Plan, starting July 1 (p. 34). All companies using more than $5000 worth quarterly will be required to make application in accordance with the system, which will be geared to strategic demands of the war program.

Use of preference ratings has been simplified (p. 35) by an amendment to Priorities Regulation No. 3. Practically all ratings can be extended or applied, effective July 1, through a single certification.

OPA has refused to permit a Mid-west steel company to raise prices on several products, though conceding that it is producing them at a loss. It rules (p. 41) that total earnings shall be the determining factor.

In a financial analysis, the Steel Institute finds operating costs last year absorbed 93½ cents of the industry's sales dollar, 2½ cents more than in 1940, 10½ cents over 1929.

A more intensive campaign to reclaim industrial scrap is forecast (p. 29) by E. L. Shaner, editor-in-chief, STEEL, who envisions a good salvage "detective" in every plant—ferreting out accumulated junk nobody else has thought of as possessing value. "Acres of Diamonds lie in industry's own back yard!" That was the gist of comment by salvage and conservation experts (p. 56) at the American Society of Mechanical Engineers' meeting in Cleveland. A campaign started in Detroit (p. 51) is aimed at all "dormant" material, including tools, dies, molds, obsolete machinery and equipment and buildings. Protest against a WPB proposal that steel mills buy scrap metals direct and process the material in their own yards was lodged (p. 117) by representatives of the scrap industry.

A plan for individual awards to workmen for meritorious suggestions was announced (p. 39) by War Production Board. Women now operate cranes and big guns (p. 55) at Aberdeen proving grounds.

PRODUCTION The steel industry continues to drive its furnaces hard, here and there open hearths going out for repairs, others going in after being repaired, the steel production rate continuing 99 per cent.

In achieving another notable record in plate production, Carnegie-Illinois Steel Corp. (p. 36) converted the Irvin Works—built primarily for light-gage products—to roll plates 1-inch thick. Inland Steel (p. 37) also reports new records for plates, its war-time output increased 300 per cent. The steel industry's total plate production last month (p. 60) reached 1,012,194 tons, of which 425,211 tons were rolled on continuous strip mills.

Alloy steels in 1941, the Steel Institute reports (p. 60) represented 9.9 per cent of all steel produced. Current alloys output is double highest peacetime figures.

TECHNICAL In Section X of STEEL's forging series, Professor Macconochie discusses the factors involved in resistance heating work for forging. As pointed out (p. 64), the method has a number of important advantages.

Additional information on the new NE (National Emergency) alloy steels is carried this week in 29 charts and three tables (p. 66). This, with the article, published last week represents most of the information available at present. As more data are developed, they will appear in STEEL.

G. G. Landis tells (p. 74) what can be done to minimize stresses and distortion in high-speed welding work. He explains the ten fundamental factors that must be controlled.

A new lead-screen technique for X-ray work that simplifies procedure and saves vital war material is described (p. 81) by Herbert R. Isenburger.

Interprocess cleaning of cartridge and shell cases (p. 86) is an important phase of munitions production on which G. Russell Hersam offers some practical information.

Drafting and operating under government contracts (p. 92) involve consideration of many important factors. In the second of a series of articles on this subject methods of computing the fixed fee, cost accounting systems, nonreimbursable and overhead items, and how to control your material expenses are discussed.

MARKETS Mill books have been practically cleared of unrated tonnages (p. 119). Maximum price has been established by OPA on fabricated reinforcing steel (p. 127). WPB regulations are improving steel distribution for war purposes (p. 119), aided by increased output.

★There IS Something you can do to get STEEL more quickly!

Steel deliveries are a problem! Stocks are depleted, mill deliveries delayed, priorities strictly enforced, demands heavier as war production intensifies! But there *is* something you can do about it—several things, in fact! Work closely with Ryerson on your requirements, and follow the common sense rules of action.

1 Make sure of your priority status.

(a) If you are engaged in direct war production and require immediate stock shipments from time to time, be sure to properly extend to us applicable priority ratings. This should be done by extending any blanket rating in the manner required by the blanket under which you are operating or by properly endorsing purchase orders, as in the case of priority ratings based on certificates.

(b) If you are not directly engaged in war production work, check up on the proper rating for your repair and maintenance requirements, because effective after May 4, a new order, amendment No. 4, supplementary to General Preference Order M-21-b, establishes closer control and greater limitations on the distribution of steel.

2 Because of the importance of following Government regulations to the letter, make sure that your orders are formally endorsed, using the proper forms when necessary. This will preclude the possibility of further correspondence that might delay shipment, or prior sale of material.

3 When possible, send orders — not inquiries. This is entirely safe because of the long-established Ryerson one-price policy. It is possible the steel, if in stock, might be sold while we are answering your inquiry.

4 Whenever practicable, state what alternate sizes, shapes, or types of steel you can use if the desired steel is not in stock.

5 It is also helpful to indicate the size or length to which the steel will be cut so that we may fit your requirements to available sizes and lengths when regular sizes and lengths are not in stock.

We are most anxious to help you with every problem of steel procurement or application, during these critical days! Do not hesitate to keep closely in touch with us.

JOSEPH T. RYERSON & SON, INC. · CHICAGO · MILWAUKEE · DETROIT · ST. LOUIS · BUFFALO · BOSTON · CINCINNATI · CLEVELAND · JERSEY CITY · PHILADELPHIA

AS THE EDITOR VIEWS THE NEWS

STEEL

June 15, 1942

EVERY PLANT NEEDS A GOOD SALVAGE DETECTIVE

Although much hard work has been done by government agencies and by industrial companies, public utilities, railroads and other interests to expand salvage operations, the results still are far from satisfactory.

This is not necessarily an indictment of any one group in the salvage set-up. Perhaps the best explanation is that individually and collectively those who are in a position to do the most effective work on the problem are just now getting warmed up to the job.

Henceforth we can expect a more intensive effort to collect scrap of all kinds essential to war production. It is quite likely that something like the Erie plan will be widely adopted throughout industry in order to bring out the several million tons of material which is hidden away in industrial properties.

The Erie plan consists of a simple community organization to prod the industrial companies in the community to go over their plants and yards with a fine-toothed comb to find everything which can be salvaged. It puts the heat on management to give up obsolete dies, jigs, templates, rolls, patterns and moulds; to scrap or sell equipment which the plant is not using and probably never will use again; to dismantle long idle water tanks and their supports, abandoned crane runways, unused smokestacks and many structural and equipment items which have been outmoded by changes in manufacturing methods.

Any company can launch its own campaign without waiting for the formation of a community organization to be created. Delegate one or more competent men to list every article of doubtful use on the premises.

Those who have tried this have been surprised at the amount of accumulated junk which the salvage detectives have turned up. In many establishments, where management has prided itself on the thoroughness with which it collects and segregates the scrap resulting from day-to-day manufacturing operations, the search for salvagable material from obsolete plant and equipment has yielded sizeable tonnages.

There are two good reasons why it is smart to go after this hidden material. First, it is the patriotic thing to do when scrap is so vital. Secondly, it is first-rate housekeeping — an important element in efficient operations.

E. L. Shaner

Editor-in-Chief

BIGGEST MISTAKE any manufacturer can make in these times is to assume he hasn't a chance of getting war contracts. There are many things he can do to get them. Most important is to realize that it requires making an entirely new set of contacts, contacts with men and organizations he never before has had to deal with, contacts with men and organizations who may never have heard of his company, its products or its production facilities.

All this means a tough selling job. It means that success comes only to those who plan their campaign carefully so as to overlook no possible avenue of approach. It means that in many cases you not only must sell your plant facilities but you must convince your prospective government purchaser that you have the technical skill to do the job, as well as sufficient financial and managerial reliability. Remember, all war work is extremely important. Some branch of the service is counting on completion of every contract, so only those manufacturers who can offer satisfactory evidence of their capability and reliability get contracts.

Your Sales Kit: The first thing to do before making any contacts at all is to prepare your sales kit. This involves effective organization of every possible evidence you can produce as to your capability and reliability. The detailed steps to follow were outlined and explained in the article "Conversion or Shutdown", STEEL, June 8, p. 30. This survey must include lists of your production machines, service and transportation facilities, worker skills, potential labor supply, and many other details.

Contact C. D. B.: With your sales kit organized for effective presentation, your first and possibly most important single contact is your nearest local field office of the Contract Distribution Branch of the War Production Board. There are 115 of these scattered throughout the country. To find the one nearest you, see the list in STEEL, April 20, 1942, Section Two, Page 26.

At this office a manufacturer can learn what war items are needed and get an idea of which ones he can make. He can study blueprints and samples. At some offices he will find exhibits of needed bits and pieces, items that prime contractors are displaying in order to find sub-

An official in charge of the exhibits at a field office of the Contract Distribution Branch of the War Production Board explains, top to bottom, the various items on display and what is involved in their manufacture. The prospective contractor's representative (light suit) was recalled from retirement to help his company get war work

CONTACTS *Will Get You* CONTRACTS

contractors to make them. Since these field offices serve as clearing houses for information for government procurement offices and prime contractors, it is important for every manufacturer seeking war work to keep in close touch with the office in his district. Additional details on help and facilities available at Contract Distribution field offices are given further along in this article.

Army Contacts: Next contact the Army procurement offices that buy what you can make. To find out where these are, write the Office of the Under Secretary of the War Department, Washington, for a copy of *Army Purchase Information Bulletin*. In it you will find maps showing locations of the field procurement planning district headquarters and the areas served by each. Addresses are listed in Table I on page 33.

Each War Department procuring agency is interested in specialized products which are assigned to certain depots or field purchasing offices. The above booklet contains a detailed alphabetical listing of products purchased and by which office.

Each of the procurement planning district offices is staffed with men familiar with the manufacturing requirements of those products assigned to that office. Thus Army purchasing practice has been decentralized effectively. It is suggested that no manufacturer go to Washington. Instead see the nearest Procurement Planning District office of a branch or service that procures a type of material he is equipped to make. Further steps to be taken by the manufacturer will be suggested at that time.

Remember, small plants in general best fit into the picture on a subcontract basis. Larger plants with more complete and greater production facilities are those desired for prime contracts. But remember, too, that firms receiving prime contracts need thousands of subcontractors to help them meet delivery dates. And means to spread subcontracting are being taken by all the procurement agencies.

Navy Contacts: Another set of contacts to be made can be obtained by getting a copy of the booklet, *Selling to the Navy*. Send your request to the Bureau of Supplies and Accounts, Navy Department, Washington. In it will be found details on who and where to contact Navy procurement agencies. Navy purchasing is centralized, it will be found.

Local Prime Contractors: For the small or medium size plant not yet in war production, the most important source of potential war work is at plants of local prime contractors. As firms now holding prime contracts became more and more loaded, they will become increasingly interested in the facilities of every plant that can help them fill their contracts. Your local office of Contract Distribution Branch of War Production Board (see list referred to above) can help you here by suggesting contacts to be made. However, CDB officials emphasize the extreme importance of every prospective subcontractor making a complete set of contacts on his own initiative.

They advise seeing every holder of prime war contracts in your vicinity. These companies can be located from the "Help Wanted" columns in the newspapers, by making personal contacts at local business organizations, by "pushing door bells" in a plant-to-plant canvas of

Blueprints and specifications for the parts exhibited are also on file for prospective contractors to examine. Such exhibits and supplementary information are a part of many facilities offered by field offices of the Contract Distribution Branch as well as district offices of the Ordnance Department and other procurement agencies

Parts to be made run all the way from small wire forms and screw machine products up to large forged sections as another prospective contractor is learning here

all the firms in your region. It is recommended that you put your salesmen in the field making these important contacts, rather than let your trained sales force disintegrate through this period.

Here is the point on which your obtaining war business hinges if you must rely on subcontracts, for Contract Distribution officials point out that regardless of the help they may be able to extend in suggesting contacts and possible war work, in the last analysis it depends upon the degree of thoroughness, initiative and aggressiveness you practice in making these contacts. Here is where "contacts will get you contracts".

Contract Distribution Field Offices: The reason that these offices were mentioned as your first and possibly most important contact is because of their exceptionally efficient and well planned facilities. First you will be asked to fill out a "Facilities Record" form which provides places to list general information concerning your company, type of work you have done, number of employes, floor space, and the like.

One of the most important parts of this record is an index classification of your shop machine facilities. It provides for listing machines under the following main heads: Bending, boring, drilling, forging, foundry, gear cutting, grinding, heat treating, honing and lapping, key seating, lathes, screw machines, milling, molding, nibblers, planers, plating and polishing, presses, shapers, tapping, threaders, welding, wire working, wood working, miscellaneous and special.

Many heads are subdivided with separate listing space for different types and sizes of machines in that general class. For instance, the boring machine classification is divided into horizontal and vertical machines. And each of these classifications is further divided into three or four different size ranges. Thus when filled out, this listing affords an excellent overall picture of the machine facilities in a plant. And when such a group of records are entered on a summary sheet, a good overall picture of facilities available in any one town or section of the country is had. These summary sheets carry the same classifications and subdivisions as vertical headings, one horizontal line then serving to list the entire machine facilities of plant.

Here is how these listings operate to get you business. A procurement office or prime contractor fills out a form showing what facilities are wanted. This then is matched against the summary of machine facilities available.

It works the other way, too. Facilities required to handle various jobs are entered on a summary sheet and these matched against the facilities available at a plant seeking work. Thus a quick search for suitable work can be made for any one plant.

These facilities records function not only to put machines into war work but also to be sure that they are utilized at least 120 hours a week. This is done by filling out a second "Facilities Record" sheet listing opposite each machine classification the number of hours per week that such equipment is idle. This is called the "Open Machine Hours" record.

Gives Up-To-Date Picture

Instance after instance can be given of how these records are putting many an idle machine to work as well as decreasing the leisure hours of needed machine capacity. Unless a machine tool is working 120 hours a week, it is considered behind in doing its share in war production. The facilities records are revised at frequent intervals to afford an up-to-date picture of facilities available and wanted. These are distributed among machine operators so they can spot an available tool from which they can get help, or a job which their idle equipment can handle.

Some machine tools are old, and many of these old timers have poor tolerances. But they are being used on rough work, saving the more accurate machines for finishing operations.

There is, for instance, the huge, old planer in a shop in Providence, R. I., that is working away on orders for its fourth war. It smoothed deck plates for the Monitor, the Civil War ironclad. Other machine tools that turned out parts for the engine of that famous ship also are enlisted for the duration of the present war.

Production from such old machines is still only a minor part of the war program, but it illustrates

the efforts being made to get all possible work from all possible tools.

Beside uncovering idle machines of the "gay nineties" vintage, facilities survey records afford the important means of almost instantly locating needed machines regardless in what plant or what part of the country they may be. For instance, a certain type and size of machine tool was badly needed for a specially important ordnance job. None appeared available so far as the manufacturer needing it could determine.

But a hurry call to Washington from the local field office to the central office of the Contract Distribution Branch uncovered 8 machines of the very type and size needed. An expert, familiar with the records, simply went down the summary sheets and quickly found what was needed. This instance is typical of the extremely important part being played by these facilities records, now said to list over 800,000 machine tools in the country.

One "Lead" Leads to Another

Thus by putting you in touch with prime contractors needing your facilities, you are aided in getting into wark work. There are other services offered by field offices of the Contract Distribution Branch.

As soon as your facilities are listed, you are placed on the mailing list to receive twice weekly copies of *War Production News*, published by local offices of the War Production Board in several sections, each section designed for interchanging information within certain areas. The Cleveland office, for instance, publishes a section going to manufacturers listed in Ohio, Kentucky, West Virginia, Western Maryland and Western Pennsylvania.

Important announcements concerning handling of war procurement are carried in this publication. A recent issue, for example, called attention to the changes whereby war contracts are let by direct negotiation.

A list of *subcontracting opportunities* is also featured. Information is given as to kind of part, material employed, machine tools and processing facilities needed, volume, tolerances, where blueprints and specifications can be seen. For the small or medium size plant, this information alone may be the means of getting into war production at once.

A list of *bidders wanted for prime contracts* is also carried. At the present time, these items are mostly in small quantities, for officials of government procurement agencies now are fairly well acquainted with the production possibilities of all large plants and so are in a position to negotiate directly on war orders in volume.

A list of *equipment wanted for purchase or lease* is also included. This serves to acquaint owners with opportunities to dispose of equipment they do not need.

A list of *equipment available for sale or lease* provides an opportunity to obtain needed machines.

A list of *open machine hours*, machines not employed full time, offers another opportunity for both machine owner and contractor seeking facilities.

By issuing this publication twice weekly, it is kept alive and a tremendous volume of contacts are made through it. See that your "war production specialist" in your plant gets it regularly.

Trained engineers at the field office of the Contract Distribution Branch will be glad to give advice and will recommend further steps and additional contacts. They will even arrange to survey your plant for possible conversion to war work.

Remember above all that the more contacts you make, the better is your chance of getting contracts. "Pushing door bells" of prime contractors has yet to be beaten as the best method for getting war work for subcontractors.

Table I—Army Procurement Planning District Offices

Air Corps

Eastern	Federal Office Bldg., 90 Church St., New York City.
Central	8505 W. Warren Ave., Detroit, Mich.
Western	506 Santa Monica Blvd., Santa Monica, Calif.

Chemical Warfare Service

Boston	Room 2000, Post Office and Courthouse Bldg., Boston, Mass.
Chicago	Room 1506, North Wacker Drive, Chicago, Ill.
New York	292 Madison Ave., New York City.
Pittsburgh	American Bank Bldg., 6th Ave. and Grant St., Pittsburgh, Pa.
San Francisco	Room 201, 1355 Market St., San Francisco, Calif.

Engineer Corps

Birmingham	Room 533, U. S. Courthouse and Customhouse, Mobile, Ala.
Chicago	1117 United States Post Office Bldg., Chicago, Ill.
New York	Room 134, 17 Battery Place, New York City.
Philadelphia	900 U. S. Customhouse, 2nd and Chestnut Sts., Philadelphia, Pa.
Pittsburgh	1012 New Federal Bldg., Pittsburgh, Pa.
San Francisco	Room 410, Customhouse, San Francisco, Calif.

Medical Department

Chicago	Rooms 1203 and 1205 U. S. P. O. Bldg., Canal and Van Buren Sts., Chicago, Ill.
New York	Kenyan Bldg., 57th St. and First Ave., Brooklyn, N. Y.
St. Louis	Second and Arsenal Sts., St. Louis, Mo.
San Francisco	San Francisco General Depot, Fort Mason, Calif.

Ordnance Department

Birmingham	700 Frank Nelson Bldg., Birmingham, Ala.
Boston	Room 1501, 140 Federal St., Boston, Mass.
Chicago	38 South Dearborn St., Chicago, Ill.
Cincinnati	831 The Enquirer Bldg., Cincinnati, O.
Cleveland	1450 Terminal Tower Bldg., Cleveland, O.
Detroit	1832 National Bank Bldg., Detroit, Mich.
Hartford	95 State St., Springfield, Mass.
New York	Room 1815, 80 Broadway, New York, N. Y.
Philadelphia	Room 1300, Mitten Bldg., Broad and Locust Sts., Philadelphia, Pa.
Pittsburgh	1202 Chamber of Commerce Bldg., Pittsburgh, Pa.
Rochester	1238 Mercantile Bldg., Rochester, N. Y.
St. Louis	Room 935, U. S. Custom & Courthouse, St. Louis, Mo.
San Francisco	402 Hotel Empire, San Francisco, Calif.
Los Angeles	409 Chamber of Commerce Bldg., Los Angeles, Calif.

Quartermaster Corps

Atlanta	Quartermaster Procurement Planning Officer, 607 Mortgage Guarantee Bldg., Atlanta, Ga.
Boston	Boston Quartermaster Depot, Army Base, Boston, Mass.
Chicago	Chicago Quartermaster Depot, 1819 W. Pershing Rd., Chicago, Ill.
Detroit	Quartermaster Procurement Planning Officer, Fort Wayne Quartermaster Motor Supply Depot, Ft. Wayne, Detroit, Mich.
Jeffersonville	Jeffersonville Quartermaster Depot, 10th St. and Meigs Ave., Jeffersonville, Ind.
New York	Quartermaster Procurement Planning Officer, 521-5th Ave., New York, N. Y.
Philadelphia	Philadelphia Quartermaster Depot, 21st and Johnston Sts., Philadelphia, Pa.
Kansas City	Kansas City Quartermaster Depot, Independence and Hardesty Aves., Kansas City, Mo.
San Antonio	San Antonio General Depot, Fort Sam Houston, Texas.
San Francisco	San Francisco General Depot, Fort Mason, San Francisco, Calif.

Signal Corps

Philadelphia	Nissahicken Ave., and Abbotsford Rd., Philadelphia, Pa.
Chicago	1819 West Pershing Rd., Chicago, Ill.
San Francisco	Presidio of San Francisco, Calif.

Overall Control of Metals Distribution Established Under PRP

✦

All companies using more than $5000 worth of scarce materials quarterly required to file under plan by June 30 . . . Emphasis will be placed on end use of supplies rather than preference ratings

✦

FIRST overall effort to co-ordinate control of the distribution and use of scarce materials, particularly metals, was announced last week by WPB. Embodied in Priorities Regulation No. 11, the system will affect practically all companies which use more than $5000 worth of metals in a calendar quarter. Companies using more than $5000 worth of metals a quarter will be required to make application under the Production Requirements Plan before June 30 and the scarce materials will be apportioned under the terms of the PRP.

Government arsenals and shipyards are subject to the requirements, as well as private manufacturers.

In explaining the new system, W. L. Batt, chairman of the WPB Requirements Committee, and J. S. Knowlson, director of Industry Operations, in a joint statement said the priorities system as it was developed last year to give preference to defense orders no longer provides adequate control.

Announcement of the new control plan followed the creation by President Roosevelt of a Combined Production and Resources Board to coordinate the distribution of materials and production programs of the United States and its Allies. The board consists of WPB Chairman Donald M. Nelson and the British Minister of Production, Oliver Lyttelton.

Messrs. Batt and Knowlson said that creation of the board gives the WPB increased responsibility for directing every available pound of material into the war program and absolutely essential uses. Production of nonessential civilian goods has been virtually stopped for the duration of the war.

The general staffs of the United Nations will advise the Combined Production and Resources Board as to strategic requirements of weapons and ships. In the same way the armed services of the United States and the Maritime Commission will inform the WPB of the types of materials and equipment most vitally needed, and their order of urgency.

Users Must Apply Under PRP

WPB Requirements Committee, on the basis of these statements of direct war needs, and other information on essential civilian needs, will establish broad policies for the distribution of scarce materials. The policy decisions of the Requirements Committee, on which the Army and Navy are represented, will determine the part of the total available supplies of basic materials which can be made available in each calendar quarter to war industries and other consuming groups.

Within these broad policy limits established by the Requirements Committee, the Bureau of Priorities will determine the maximum quantities of scarce materials which may be acquired by each individual company required to qualify under the plan in each three-month period beginning July 1. In making these determinations, the Bureau of Priorities will be guided by the recommendations of the armed services, and of the other divisions of the WPB.

Basic instrument which will be used in this quarterly apportionment of materials is the PRP. The PRP under this program will no longer be primarily a mechanism for the assignment of preference ratings to each applicant on the basis of the rated orders the applicant has on his books. PRP now becomes the chief means by which WPB will execute general policies.

The emphasis from now on will be on the end use of materials rather than on preference ratings. A classification system, already announced, (STEEL, June 8, p. 36), will be used to obtain information on end use to assist in controlling the distribution of metals during the fourth quarter.

For the first time, by this means, the WPB will have centralized control of the distribution of materials, and will be able to relate the total quantities of materials for which preference ratings are assigned to the available supply.

"This ambitious program cannot be put into full operation in one step," said Messrs. Batt and Knowlson. "For the third quarter of this year, therefore, the primary emphasis will be on the distribution and use of metals. Only companies which use more than $5000 worth of basic metal in a calendar quarter will be required to apply under the Production Requirements Plan for the quarter beginning July 1. A few special classes of companies, such as those engaged in transportation, construction, mining, and public utility services, will be controlled by existing procedures for the present. The branches of the WPB which handle allocations and assignment of priority ratings will be guided by the broad policy determinations made by the Requirements Committee for each group of metals users.

"Every large user of metal will be required to obtain a quarterly authorization for all his scarce material under the PRP. It should be understood, however, that a rating under PRP does not constitute a guarantee of delivery of materials covered by the rating. Actual shipments of critical materials now under allocation control will be governed by month-to-month directions from the WPB, as heretofore, on the basis of the appropriate forms required for each material.

"For the benefit of companies which use less than $5000 worth of basic metal in a quarter, and are therefore not now required to apply under the PRP, a percentage of the total supply materials will be set aside, and they may obtain their minimum requirements from this reserve by use of the regular priorities procedures which have been in effect up to now.

"To prevent leaks in the program, all companies which receive certificates under PRP will be prohibited, after July 1, from using or extending preference ratings assigned in

any other way, except for construction, or items of capital equipment. Companies which have filed a PRP application may continue to use other ratings within specified limits until they receive their certificate, but no company using more than $5000 worth of basic metal in a quarter which has not filed a PRP application by July 1 may use any form of preference rating for production materials after that date."

In presenting the metal control plan to his staff, WPB Chairman Nelson said: "The job is one that challenges all our abilities, and demands your personal attention, to see that the day-to-day flow of material is not interrupted but is intelligently guided into war production."

Excepted from the plan are the United States and other government agencies (not including those engaged in manufacture, such as shipyards, arsenals, prison factories, etc., which are subject to the requirements); companies or persons engaged in: Transportation; supplying heat, light, power, electricity, gas or water; mining or quarrying; production, refining, transportation, distribution or marketing of petroleum or associated hydrocarbons; communications; sewerage or drainage; wholesaling, retailing, warehousing or similar operations which do not involve the manufacture or processing of materials; extracting, smelting, refining, alloying, or processing metal ores or scrap into raw material; construction.

With these exceptions all companies using more than $5000 worth of metal quarterly are defined as Class I producers and are required to file a PRP application not later than June 30.

Interim Procedure Provided

An interim procedure is provided, allowing companies which have properly filed an application but have not yet received a rating certificate under PRP to continue applying preference ratings under any appropriate "P" order (even if the "P" order was scheduled to expire on June 30) or individual preference rating certificate, or to extend preference ratings on orders which the company is engaged in filling.

However, the company may not use any such preference rating or ratings to obtain more than 40 per cent of the amount of any given material which has been indicated in its PRP application as the estimated requirement for the quarter, and any material so obtained must be deducted from the amount authorized on the PRP certificate when it is received.

No Class I Producer who fails to file a PRP application by June 30 may use any preference rating after that date except ratings specifically assigned for construction or capital equipment of first importance.

No company which has received a PRP certificate may apply or extend any other preference rating except for capital equipment or construction, and no such company may accept delivery of materials listed in Materials List No. 1 of the PRP application form, PD-25A, or other materials for which he has sought priority assistance, in greater quantities than those authorized on the certificate, even if the materials can be obtained without use of a preference rating. Companies operating under PRP which need capital equipment or priority assistance for construction or expansion may apply in the usual way on PD-1A or PD-200 and PD-200A application forms.

Extension of Preference Ratings Simplified, Standardized by WPB

WASHINGTON

THE USE of preference ratings will be simplified and standardized by an amendment to Priorities Regulation No. 3, announced last week by WPB.

Effective July 1, any preference rating, no matter how it has been assigned, may be applied or extended by a single form of certification, which states merely that the purchaser certified to the seller and to WPB that he is entitled to use the preference ratings indicated on his purchase order, in accordance with the terms of Priorities Regulation No. 3.

Provisions of existing orders which require a purchaser to furnish his supplier with copies of preference rating orders or other special certifications are all rescinded, except for the special provisions of Priorities Regulation No. 9 with respect to the application of preference ratings for certain types of exports. This change does not, however, affect any provision of existing preference rating orders which limits the kinds of material which may be obtained by use of the assigned rating, or which requires specific information on purchase orders.

In addition to the standard certification, orders on which a preference rating is applied or extended after July 1 must also include the identification symbols required by Priorities Regulation No. 10, which established the Allocation Classification system.

The amended Regulation No. 3 restricts extension of preference ratings, in most cases, to material which will be delivered to, or physically incorporated in a product delivered to the person to whom the rating was originally assigned, or which will be used to replace in inventory materials so delivered, subject to definite limitations.

A rating may not be extended to replace materials in inventory except to the extent necessary to restore the inventory to a practical working minimum. No rating above A-1-b may be assigned to orders for replacement of inventory materials.

A "basketing" provision permits the simultaneous extension of ratings which have been assigned by different preference rating certificates or orders on a single purchase order.

Special provision is made for small manufacturers not operating under the Production Requirements Plan. Such producers may extend ratings to deliveries of operating supplies including lubricants, small perishable tools, etc., which are required and will be consumed in filling the rated order which they are extending, but the cost of such operating supplies must not exceed 10 per cent of the cost of the material to which the rating is extended and which such supplies are used to process. Not more than 25 per cent of the operating supplies obtained in this way during any month may be metals in the forms described in the Metals List of Priorities Regulation No. 11.

80,000 Carnegie Workers Vote on Bargaining Agent

PITTSBURGH

More than 80,000 employes of Carnegie-Illinois Steel Corp., voted last week to determine whether or not the Steel Workers Organizing Committee (which since has changed its name to United Steelworkers of America) shall be exclusive bargaining agent for all the company's workers.

Results will be overwhelmingly in favor of the union. These elections have been held in all major subsidiaries of United States Steel Corp., of which Carnegie is one, and thus far the results have been 63,556 for the union and 5057 against.

The union is expected to use the final tabulation to back up its claim for a closed shop in all plants of the corporation. Undoubtedly the company will oppose such a plan, but the union is counting on the support of the War Labor Board.

Irvin Works, Converted for Plates in 37 Days, Raises U. S. Steel Record

PITTSBURGH

AN "extra dividend" of enough steel plate to build 12 large cargo ships was one of Carnegie-Illinois Steel Corp.'s May contributions to America's rolling offensive in the War of Production. The U. S. Steel subsidiary last month produced 329,069 tons of plates for ships and other urgent war needs, a new record and greater by 41,000 tons than its prior high established in March.

To attain increased plate capacity the company converted its most modern plant from production of light steels to plates. Facilities of Irvin Works, completed recently and originally intended to produce light-gage material, were extensively rebuilt and enlarged in 37 days. It is estimated that if the finishing facilities had been purchased as new equipment, completion of the job would have taken from eight to 12 months.

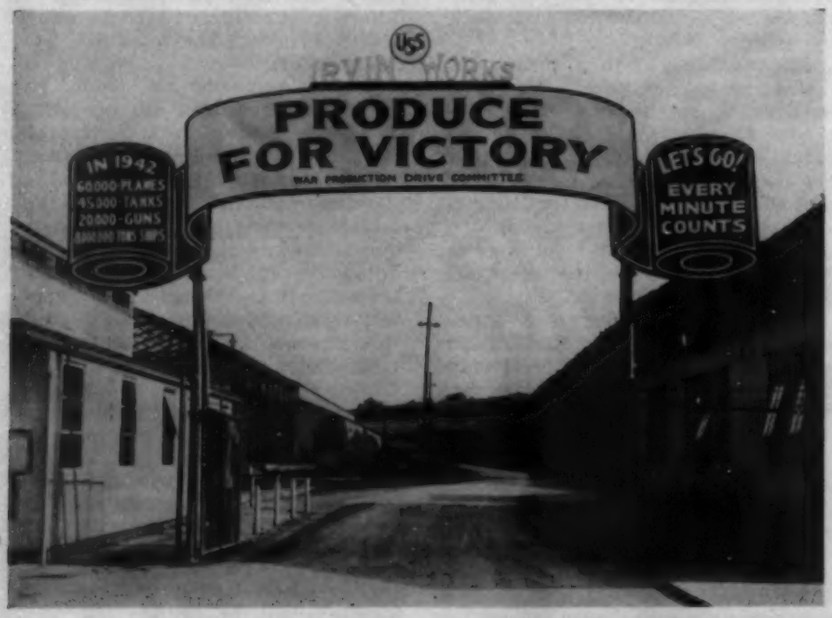
The giant 80-inch hot strip mill at Irvin was converted to handle plates as heavy as 1-inch in thickness and 72 inches wide. Losing no time, the converted Irvin mill in May produced 38,000 tons of plates, is scheduled to increase its tempo to 47,000 tons this month, and before July will be geared to a schedule of 55,000 to 60,000 tons.

In converting the finishing end of the continuous hot reduction line at Irvin, "bits and pieces" from numerous plants were brought together, rebuilt and installed by the company's own force, enabling the work to be speeded up considerably. In one case, a steam-driven shear, of nineteenth century vintage, was coupled with an old roller-leveler, and both units reconditioned into a modern electric-driven finishing line on which a single crew now holds the record of 636.5 tons of finished plates in one eight-hour turn. This record was accomplished by a crew recruited from other departments of the plant, now inactive, having about four weeks training on the new plate finishing unit.

New finishing facilities installed to bring about conversion include a piler at the hot strip mill proper as well as at the shearing line. Plates are piled in stacks after rolling and then are placed on cooling beds until the temperature has dropped sufficiently to allow final processing.

The shearing line consists of a cross transfer to convey stacks of plates from the adjacent building where they have been cooled, a magnetic depiler to lift and place the plates on the sheer line, a leveler, entry table, roller leveler to flatten the plates, intermediate tables, shear to cut plate to proper length, discharge table and piler to stack finished product.

Plate production at Irvin is now accounting for about 60 per cent of the continuous hot strip mill's out-



IRVIN works' War Production Drive Committee erected the sign "Produce for Victory" at the plant gate

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Another action by the committee is the suggestion box and display layout, as illustrated. Related to this subject of suggestions from employes is the story on page 39 concerning a plan for individual awards to workmen who devise better means for war production, as announced by WPB

put, the balance at present being confined to black plate and tin plate, produced under high priority and allocation orders. There are no sheets being produced at the plant, but despite this shutdown employment at Irvin remains at the same level which obtained when this large department was in full operation.

Inland Ships Hot Steel As Plate Output Soars

CHICAGO

Steel is shipped hot—too hot for wooden cars—from the Indiana Harbor works of Inland Steel Co., and rushed in steel cars to shipbuilding companies. The plant last month established new records in production. Its war time output of plate has been increased by more than 300 per cent. Its total program for the period was 80,000 tons of plate, a record performance.

Three mills contributed to the record, company officials said. These are the 76-inch continuous hot strip mill and the 100-inch sheared plate mill, from which plates are loaded for shipment while still hot, and the 24-inch universal plate and structural mill.

The 76-inch mill, it was explained, ordinarily is used for the production of sheets or bends for the cold reduction mill, but with the cessation in demands for this type of products, it has been turned to making plates.

Armco Plant Establishes Third Production Record

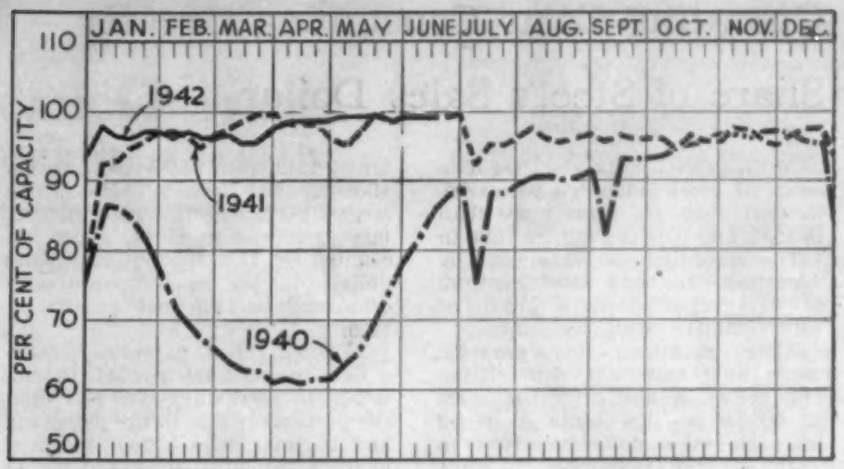
Hamilton, O., plant of the American Rolling Mill Co. in May established its third consecutive monthly production record, C. R. Hook, president, has informed WPB Chairman Nelson.

In March, following the formation of a labor-management committee, the plant established a then all-time record with 38,141 tons. In April this was surpassed with output of 38,785 tons. May production was 41,099 tons.

Kenneth Leith Dead

Kenneth Leith, 40, consulting mining engineer and geologist, Amherst, Va., died June 10 in Lynchburg, Va., following a brief illness.

Son of Dr. C. K. Leith, Madison, Wis., he followed the geological and mining profession of his father. For several years he was geologist for the Vanadium Corp. of America. He also served as consultant to the National Resources Committee in Washington, 1935 to 1937. Since June, 1940, he has been mineral consultant to the War Production Board. A brother, Andrew, is chief of WPB's chrome-manganese branch.



PRODUCTION . . . . Steady

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week was unchanged at 99 per cent, for the fourth consecutive week. Three districts advanced, four declined and five were unchanged. A year ago the rate was 99 per cent; two years ago it was 86 per cent, both based on capacity as of those dates.

Youngstown, O.—With 75 open hearths and three bessemers in production the rate advanced 1 point to 95 per cent last week. Scrap supply is precarious and output is maintained only by careful planning, with little prospect for increase. Last idle blast furnace, at Carnegie-Illinois' Ohio works will resume this week. Schedule for this week is unchanged.

Chicago—Declined ½-point to 104 per cent, lowest in three weeks, due to repairs to furnaces. Scrap supply was sufficient. Four of the six plants operated at 100 per cent or higher.

Birmingham, Ala.—Unchanged at 95 per cent, 23 open hearths in operation.

St. Louis—Withdrawal of one open hearth for repair at the Granite City Steel Co. plant caused the rate to drop 2½ points to 95½ per cent.

Detroit—Dropped 1 point to 86 per cent on shifting of furnaces.

Buffalo—Continuing 39 of the 43 open hearths in the district steelmakers held the rate at 90½ per cent for the fifth week.

Cincinnati—Advanced 3½ points to 95 per cent as an open hearth was relighted after repairs.

Central eastern seaboard—Steelmaking maintained 96 per cent.

New England—Regained 6 points to 95 per cent, two steelworks being at 100 per cent.

Pittsburgh—Held at 95½ per cent, furnace repairs preventing a higher rate.

Wheeling—Lost 3½ points to 78 per cent as furnace repairs became necessary.

Cleveland—Changes in production units balanced and the rate was steady at 94 per cent for the third week.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended June 13	Change	Same week 1941	Same week 1940
Pittsburgh	95.5	None	100.5	81
Chicago	104	−0.5	102	91.5
Eastern Pa.	96	None	97	76
Youngstown	95	+1	98	70
Wheeling	78	−3.5	88	90
Cleveland	94	None	92	82
Buffalo	90.5	None	90.5	90
Birmingham	95	None	95	88
New England	95	+6	94	66
Cincinnati	95	+3.5	89	76
St. Louis	95.5	−2.5	98	68
Detroit	86	−1	92	95
Average	99	None	*99	*86

*Computed on basis of steelmaking capacity as of these dates.

Kaiser Mill To Produce 300,000 Tons of Plates

New steel mill to be constructed by Kaiser Co. Inc. at Fortuna, Calif., will have capacity for 300,000 tons of sheared plates annually it was learned last week.

Plant will include a 1200-ton blast furnace and open hearths in addition to a 110-inch plate mill. To cost between $40,000,000 and $50,000,000, the plant will be started about the end of the year. It will be partially financed by a Reconstruction Finance Corp. loan.

Operating Costs Consuming Greater Share of Steel's Sales Dollar

OPERATING costs absorbed 93½ cents of steel industry's sales dollar last year, 2½ cents more than in 1940, and 10½ cents more than in 1929, according to analysis by American Iron and Steel Institute of data reported by a group of representative steel companies.

After providing for payrolls, taxes, raw materials, depreciation and depletion and all other costs of production, 6½ cents remained of each sales dollar received in 1941. Of the remainder, 3 cents were paid out in dividends to stockholders, ½-cent was paid out as interest to bond holders, while the balance was added to the companies' surpluses as reserves for future needs.

In 1940, costs of operation consumed 91 cents of each sales dollar. Dividends represented 4 cents, 1 cent was accounted for by interest, while 4 cents were left in the business as an addition to surplus.

In 1929, a total of 17 cents was available for interest, dividends and addition to surplus, after meeting operating expenses. The rise in operating costs, evident during 1941, continued in the first quarter of 1942, with taxes and payrolls showing the largest gains. The largest percentage increase in costs last year was in taxes, which accounted for 11½ cents of each sales dollar in 1941, as compared with 6½ cents in 1940 and 4 cents in 1929.

Although steel payrolls rose to a new record total in 1941, the increase in percentage was less than the percentage rise in tax payments and in total sales. Steel industry payrolls last year accounted for 33 cents of each sales dollar received, compared with 35 cents in 1940.

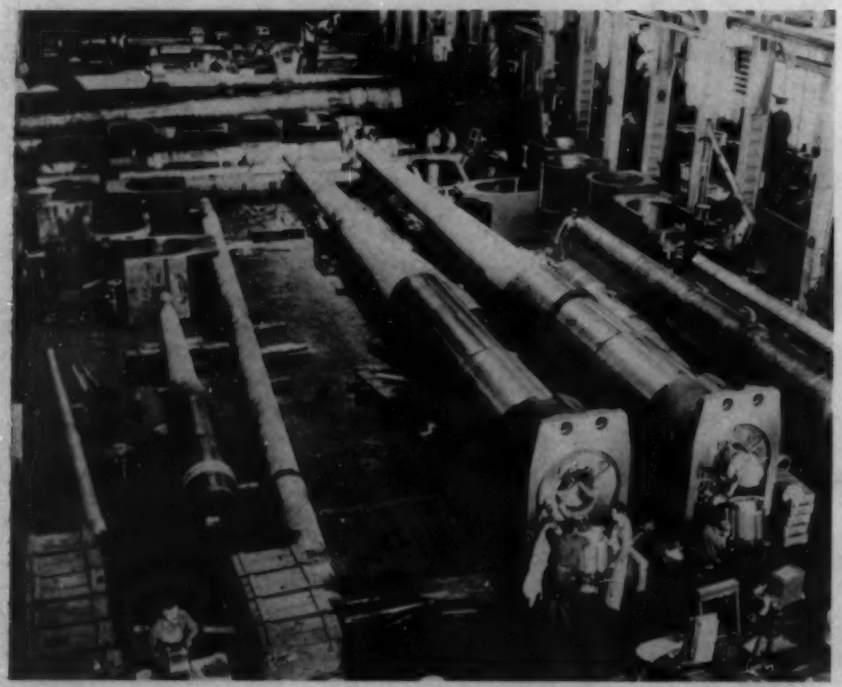
Four and one-half cents of each sales dollar were set aside last year as a reserve for depletion and depreciation. In 1940, charges for depreciation and depletion accounted for 5 cents of each sales dollar.

Ryerson To Head Steel Industry's Safety Drive

As recently appointed chairman of the steel and iron division of the War Production Fund to Conserve Manpower, Edward L. Ryerson, chairman, Inland Steel Co., Chicago, will organize a drive in the industry to obtain $400,000 for a projected two-year campaign, it was announced last week. The Fund is an agency of the National Safety Council.

Part of the national industrial mobilization undertaken at President Roosevelt's behest to prevent wastage of human and material resources through accidents, the drive will be directed at maintaining the iron and steel industry's present low rating for frequency of accidents and to lower its high rating for severity of accidents.

16-Inch Guns Ready To Defend America's Coasts



SIXTEEN-INCH seacoast guns are readied for shipment on the production floor of an Army ordnance department arsenal. Two guns at lower right already have had breech mechanisms installed. Associated Press photo

J&L Holds Priority Rules Inconsistent; Denies Violation

In Federal Court last Thursday, Jones & Laughlin Steel Corp., Pittsburgh, denied point by point practically every accusation of priority violation listed in a complaint filed by the War Production Board.

Requesting dismissal of the suit, company asserted that it has "never delivered a given product on an order bearing a low or no preference rating when the product so delivered could or should have been used to fill an order bearing a higher preference rating."

It was further asserted that the constantly changing regulations of the WPB and its predecessor, the OPM, "have not always been consistent with each other, or well understood, or susceptible of complete compliance;" that none of the actions detailed in the complaint have hindered accomplishment of the purposes of the National Defense Act and of the War Powers Act.

Denying specific instances of violations, company claimed that none of the shipments in any way interfered with the delivery of steel on high priority orders and that in some cases delivery complained of was made on direct order from the WPB or other government agency. It also explained that in some cases steel had been made for specific orders before regulations affecting that steel were issued and as the steel was not suited for other products it was finished as the product for which it was originally intended, such as steel pipe.

Members of the National Warm Air Heating and Air Conditioning Association, meeting in Chicago last week, were urged to convert to production of war materials as quickly and effectively as possible.

REVISIONS AND ADDITIONS TO

PRIORITIES – ALLOCATIONS – PRICES

as published in Section Two of STEEL, April 20, 1942

"M" ORDERS

M-39-b (Amendment): **Cobalt,** effective June 6. Permits use of cobalt-nickel oxide in manufacture of ground coat frit, if oxide cannot be practicably separated into cobalt and nickel.

M-43-a (Amended): **Tin,** June 5, 1942. Use in noncritical products reduced additional 10%, effective July 1. Prohibits manufacture and use of tin oxide except on orders rated A-1-k or higher and restricts amount of tin that may be used in solder and printing plates. Permits tinning of certain dairy implements; tin use in plating caps for mineral extraction; in babbitt metal; repair of certain diesel engines; and ship maintenance and repair under ratings assigned by Maritime Commission.

M-56 (Amended): **Natural Resins,** effective June 5. Removes restrictions on use of natural resins in manufacture of playing cards, pencils, house paint, label varnishes, toys, and farm equipment finishes.

M-63 (Amended): **Imports of Strategic Materials,** issued June 2. Places control over imports of commodities for civilian use as well as strategic war materials, beginning July 2. Does not apply to certain items from Canada or Mexico.

M-126 (Amendment): **Iron and Steel Conservation,** effective June 9. Exempts steel stamps used for marking metal from restrictions of order.

M-130: Passenger Automobiles, effective June 12. Provides for rationing passenger cars to the Army, Navy, Marine Corps and government agencies engaged directly in the war effort.

"P" ORDERS

P-31-a: Foundry Equipment, issued June 5. Permits suppliers and sub-suppliers of foundry equipment and repair parts to continue to use ratings assigned by P-31 to complete deliveries after expiration of latter order on May 30.

P-131: Officers' Uniforms, effective June 8. Assigns A-1-i rating to materials used in making Army, Navy, Marine Corps and other war agency officers' uniforms. After June 30, suppliers of metal buttons and closures required to obtain priority assistance under Production Requirements Plan.

"L" ORDERS

L-20 (Amended): **Cellophane,** effective June 8. Limits order restrictions to transparent cellulose sheets .003-inch or less in thickness. Adds certain miscellaneous products to list for which cellophane use in packaging, sealing or manufacture is prohibited.

L-21-a (Amendment): **Coin Operated Machines,** effective June 4. Extends order to cover manufacturers of parts, as well as of complete units, for automatic phonographs and weighing, amusement and gaming machines.

L-71 (Amendment): **Flashlights,** effective June 5. Permits makers of flashlight cases and batteries to use inventories of plated iron and steel at not in excess of 1940 rate. Materials must have been plated prior to March 31 and in possesion of manufacturer or supplier. Permits use in cases or batteries of iron and steel in fabricated form and in possession of manufacturer or supplier prior to April 1.

L-74 (Amendment): **Oil Burners,** effective June 4. Permits manufacture of burners designed for use on shipboard, for use in cooking, or for use in heat treating.

L-91 (Amendment): **Laundry, Dry Cleaning, Pressing Machinery,** effective June 3. Permits manufacturers to assemble machinery after specified dates for shutdown of the industry, when delivery has been approved by Director of Industry Operations and only remaining work necessary is assembly of completely fabricated parts.

L-93 (Amendment): **Golf Clubs,** effective June 4. Permits production until June 30, provided material used consists of parts fabricated prior to April 9. Original order required production to stop on May 31.

L-105 (Amendment): **Protective Helmets,** effective June 5. Permits assembly and sale of helmet parts which were in possession April 29 and sale of those helmets already manufactured.

L-117 (Amendment): **Heavy Power and Steam Equipment,** effective June 8. Permits deliveries against ratings of A-9 or higher assigned by PD-2, PD-4, PD-5, P-5b and PD-25A certificates.

L-145: Aircraft Control and Pulley Bearings, effective June 9. Limits production of certain sizes of such bearings to specified producers. Manufacturers not authorized to make these bearings prohibited from disposing of tools and equipment used for such purpose.

L-146: Welding Rods, Electrodes, effective June 13. Limits deliveries, other than to government agencies, Lend-Lease and accredited schools, to orders rated A-9 or higher. Alloy rods and electrodes takes A-1-j or higher. Restricts use by schools. Producers may deliver not over 6% of total shipments for repair and maintenance purposes. Stocks of consumers limited to 60-day supply. Producers report shipments to WPB by 18th each month on PD-528.

PRICE SCHEDULES

No. 43 (Amendment): **Used Steel Drums and Pails.** Establishes following prices on used steel paint pails of 2, 3 and 5-gallon capacity: 10, 15 and 20 cents, respectively, for raw pails with cover; 2, 7 and 10 cents for pails without cover; 31, 36 and 45 cents for fully reconditioned pails. Requires deductions from maximum prices for reconditioned drums left unpainted at request of purchaser.

No. 158—Bicycles, effective June 5. Sets national retail prices for "war model" bicycles at $32.50 in the East, $33.50 in Middle Zone, $34.50 in Far West.

No. 159—Concrete Reinforcing Bars (fabricated), effective June 15, 1942. Allows fabricator margin of 50 cents per 100 lbs. above f.o.b. mill price. Maximum delivered prices of fabricated bars in cents per lb., 2.40. Exceptions: 2.77 if bought by fabricator at Gulf basing point price, 2.80 at Pacific Coast basing point; 2.57 in carloads delivered Toledo; 2.52 in carloads delivered Detroit.

For additional revisions and additions please see STEEL of April 27, p. 30; May 4, p. 46; May 11, p. 55; May 18, p. 46; May 25, p. 42; June 1, p. 36; June 8, p. 39.

Ready Now . . .

ALLOCATION CLASSIFICATION SYSTEM

This system becomes applicable to all orders placed after June 30 and on orders calling for delivery after July 31.

Copies of the regulations covering this system are available in an 8-page booklet printed on high-grade paper. Address STEEL—Reader's Service Dept., Penton Building, Cleveland, O.

PRICES

1 to	25	10 cents each
25 to	100	08 cents each
100 to	250	07 cents each
250 to	500	06 cents each
500 to	1000	05 cents each
1000		4½ cents each

Prices over 1000 available upon request.

WPB To Reward Workers for Ideas

WASHINGTON

PLAN for individual awards to workmen who devise means for more or better war production was announced last week by WPB.

Three awards are planned. They are restricted to plants with voluntary labor-management committees organized in accordance with the plan put forth by the WPB.

The first is the "Award of Individual Production Merit," which plant committees are authorized to grant. This may be given to any workman after the plant committee decides that his suggestion improves quality or production or conserves a critical material or in other tangible ways increases the effectiveness of the war production of the plant.

The second award is the "Certificate of Individual Production Merit". This will be awarded by War Production Drive Headquarters and it will be granted to those making outstanding suggestions. War Production Drive Headquarters will require that the suggestion first be adopted in the plant and that the labor-management committee submit a complete report of its adoption.

The third and highest award will be the "Citation of Individual Production Merit", which will be awarded to the maker of a suggestion that will have an outstanding effect on the entire war effort. The citation will be granted only after a suggestion has been found worthy of the distinction by a technical committee of the WPB. Donald M. Nelson, WPB chairman, will sign the citation.

WINDOWS of WASHINGTON

By L. M. LAMM *Washington Editor, STEEL*

Cold-drawn seamless tubing users asked to adopt substitutes . . .
Foreign-owned patents and royalties seized by United States . . .
Use of tin in noncritical products to be reduced another 10 per cent

WASHINGTON

PERSONNEL of the WPB Iron and Steel Branch will be almost doubled, from about 500 at present to 1000, it was announced last week. Closer control over the distribution of iron and steel products is necessitating the increase.

The branch will move from its present quarters in Temporary Building R to the air-conditioned New Social Security Building. Present quarters are so crowded that some employes are stationed in passageways.

Several changes in the staff were announced last week by Reese H. Taylor, chief.

Charles Halcomb, present chief of the Products Section, becomes chief of the Allocations and Priorities Section, succeeding Stanley B. Adams.

David Austin, executive consultant, is the new chief of the Products Section.

Mr. Adams has been placed in charge of co-ordinating PD-25A information for the Materials Division and later will join the Bureau of Priorities of the Division of Industry Operations.

Before joining the war effort in May, 1941, Mr. Adams was with the Dravo Corp., Pittsburgh. His previous experience included designing and engineering a large steel plant in the Ukraine for the Dnieprostoy Metal Works Russian Commission.

Mr. Halcomb, for the last 17 years Philadelphia district manager for the Procter & Gamble Co., joined the government in 1941.

Mr. Austin, vice president in charge of sales for the Carnegie-Illinois Steel Corp., Pittsburgh, joined the war organization in January of this year.

W. G. W. Glos has been appointed head priority specialist for the industry branches in the WPB Division of Industry Operations. Mr. Glos has served since August, 1941, as head priority specialist assigned to the Production Division.

Walter C. Armstrong, who has been acting as assistant to Mr. Glos on the priorities staff for the Production Division, has been appointed head priority specialist for that division. He has been with the Office of Production Management and WPB since September, 1941.

Charles H. McArthur has succeeded George T. Weymouth as chief of the Industrial Salvage Section in the Bureau of Industrial Conservation.

More Industry Advisory Committees Organized

Formation of the following industry advisory committees in the metalworking field was announced last week by T. Spencer Shore, chief WPB Bureau of Industry Advisory Committees:

High Pressure Steel Gas Cylinder

Charles Dailey, chief, Steel Drums and Tight Cooperage Section, Containers Branch, government presiding officer.

Committee members: Wilbert Wear, Harrisburg Steel Corp., Harrisburg, Pa.; G. R. Hanks, Taylor-Wharton Iron & Steel Co., Easton, Pa.; H. E. Passmore, National Tube Co., Pittsburgh; H. O. Brumder, Pressed Steel Tank Co., Milwaukee; Walter H. Freygang, Walter Kidde & Co., New York; Edward E. O'Neill, American LaFrance-Foamite Corp., Elmira, N. Y.

Telephone Equipment & Supplies

Bruce H. McCurdy, chief, Telephone Section, Communications Branch, government presiding officer.

Committee members: Fred Clarke, Western Electric Co., New York; R. A. Gantt, International Telephone & Telegraph Co., New York; F. R. McBerty, North Electric Co., Galion, O.; M. K. McGrath, Kellogg Switchboard & Supply Co., Chicago; W. L. Runzel, Runzel Cord & Wire Co., Chicago; A. F. Gibson, Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y.; W. C. Hasselhorn, Cook Electric Co., Chicago; J. W. Shipman, Automatic Electric Co., Chicago; R. W. Siemund, Leich Electric Co., Chicago.

Diversion of Farm Equipment Prohibited by War Board

To assure delivery of essential equipment to the American farmer, WPB has ordered that products manufactured under its farm machinery and equipment program must actually reach the farm, and must not be diverted to industrial or other nonagricultural uses.

In Supplementary Limitation Order L-26-d, WPB makes it plain that its program is designed solely for production of essential machinery and equipment for farms, including such items as domestic water systems and garden tractors, which have been found to have been diverted in many instances to nonagricultural activities.

The order provides that no one may sell any farm machinery and equipment or attachments which he knows or has reason to know will not be used by the ultimate consumer for the production or care of crops, livestock or other produce on a farm or on a poultry-raising farm. This restriction does not apply to orders bearing a preference rating of A-9 or higher. Repair parts are not covered by the order.

In another action affecting the farm machinery industry, WPB issued Amendment No. 3 to Preference Rating Order P-95, permitting deliveries of iron and steel to producers after June 30 provided the iron and steel has been scheduled for rolling and rolling has actually commenced on or before that date. Order P-95, as amended, which makes available an A-1-a rating to manufacturers to obtain materials going into the production of certain essential farm equipment, originally provided that the rating could not be used to obtain material not scheduled for delivery before June 30.

Cold-Drawn Seamless Tubing Consumers Asked To Use Less

Users of steel tubing have been asked to limit consumption of cold-drawn seamless tubing to operations where no substitute is possible. To avert a critical shortage of this tubing in essential war production of planes, guns, bombs, ships, and other vital war products strict conservation must be practiced and substitutes used in every possible case.

In a letter to users of cold-drawn tubing, Reese Taylor, chief, WPB Iron and Steel Branch, said substitutes are available and satisfactory for a number of purposes and asked that hot-rolled seamless, electrically welded, gas welded, lap welded, or butt welded tubing be used wherever possible.

Wolff Patents Seized by Alien Property Custodian

Leo T. Crowley, alien property custodian, has vested in the name of the United States all right, title, and interest, including accumulated royalties, of G. Wolff Jr. Kom, Ges. in a contract between that German company and the Koppers Co., Pittsburgh. The contract licenses Koppers Co. to install self-sealing doors for coke ovens that are manufactured under patents granted the German concern.

The license agreement provided for payment to the German firm of $60 for each pair of oven doors installed.

Royalties accumulated under the

contract since remittances to Wolff were stopped in 1940 total about $50,000. Several thousand dollars in addition are involved in projects currently being built by Koppers for the Defense Plant Corp. All royalties under the contract henceforth will be payable to the alien property custodian.

Bureau of Construction Moved to New York City

WPB Bureau of Construction is moving to New York and opening headquarters in the Empire State building.

Except for a small office staff which will remain in Washington for liaison work, the entire organization under William V. Kahler, chief, is affected by the change. Thomas L. Peyton, assistant to the chief, will be in charge of the Washington office.

Bureau is divided into five operating branches: Project Analysis Branch; Materials Control Branch; Project Service Branch; Housing Branch; Consultation Branch.

Use of Tin in Noncritical Products Further Restricted

To provide additional tin for military needs and civilian food supply, tin used in noncritical products will be cut another 10 per cent, effective July 1.

This reduction, plus certain others are contained in an amended version of Tin Conservation Order M-43-a.

Use of tin in some 28 types of products (those on List "A") is forbidden, as in the original order. All other products, except those covered by other specific WPB orders, may, after July 1, use only 30 per cent of the amount of tin used in the corresponding quarter of 1940. Until June 30, 1942, 40 per cent of the 1940 amount may be used. This will effect a 10 per cent reduction of tin consumption in all products not specifically excepted in the order.

Restriction to the 40 per cent and 30 per cent use does not apply (where substitutes are impracticable) to manufacture of products carrying a preference rating of A-1-k or higher, to bearing metals produced with a rating of A-3 or higher, to the manufacture of terne plate and tin plate under the terms of Order M-21-e, or to certain kinds of solder for cans and containers under Orders M-81 and M-86.

Second-Hand Machinery Price Schedule To Be Set Up July 1

Maximum prices for second-hand machinery and electrical products will be established July 1 under the terms of Maximum Price Regulation No. 136, on machines and parts, Price Administrator Leon Henderson said last week.

"Since the WPB has limited the production of much new machinery there has been a very active demand for many types of second-hand machinery with corresponding increases in prices," the price administrator said. "In a number of cases the price of a used machine has equalled or exceeded the new price."

Used processing, mining, construction, electrical and railroad machinery and equipment, together with parts of such machines, are included in the machines or parts covered by the regulation.

Rules Not All Steel Products Must Show Profit

Northwestern Steel & Wire Co., Sterling, Ill., was denied permission to increase prices on several of its products by OPA last week. The price-fixing agency contended it is not necessary to raise prices of certain products above OPA maximums so that no products shall show a loss if the producer's overall earnings picture is satisfactory.

OPA conceded that the company is producing nails and coarse bail tie wire at a loss. However, it was held that the company's earnings on all products were such that relief was not justified.

War Production Drive Extended To Nonferrous Mining Industry

Extension of the war production drive into the nonferrous metal mining industry in an effort to step up production of these basic war metals was started at a joint labor-management rally June 13 (Miners Day) at Butte, Mont., an important copper and zinc producing center. WPB chairman Nelson spoke to the rally in Butte by long-distance phone.

Program for the drive is being worked out jointly by A. I. Henderson, director of the Materials Division, and Wendell Lund, director of the Labor Production Division. The latter have organized special committees to aid in the drive.

Mr. Nelson, in his call for labor-management co-operation with government in making the drive effective, emphasized the vital importance to the war program of the nonferrous metals and the men who produce them.

"The raw materials men are vital to full production," Mr. Nelson said. "We need more copper, more zinc, more lead and more of the other metals that come out of the production line in the shape of planes, tanks, ships and other implements of war.

"The miners and other workers in this industry are production soldiers and they must step up output before we can provide all the weapons and the ammunition that our soldiers on the battle front need —and will get."

Participating in the send-off rally at Butte were officials of the Anaconda Copper Mining Co., the International Union of Mine, Mill and Smelter Workers, CIO, and the various craft unions in the mining industry affiliated with the American Federation of Labor.

Additional Foreign Patents Seized by U. S. Government

An additional 600 enemy-owned patents have been taken over by Leo T. Crowley, alien property custodian. With the exception of five patents of Hungarian origin, all were formerly the property of German corporations.

The patents seized include:

More than 200 owned by Telefunken, relating primarily to radio and television equipment.

Another group owned by Siemens covering aircraft instruments;

Recent patents issued to Zeiss-Ikon relating to cameras and optical equipment;

Patents of Dornier Werke on aircraft, including flying boats;

Chemical patents of Deutsche Gold and Silber Scheideanstalt and Deutsche Hydrierwerke; and

Miscellaneous patents in the fields of textile machinery and automobile construction.

The office of the alien property custodian now has stepped up to about 1000 its weekly rate of patents taken over from enemy owners.

J. T. Somers Elected Chairman Cold-Finished Bar Committee

Joseph T. Somers, president, Wyckoff Drawn Steel Co., Pittsburgh, has been elected chairman of the cold-finished bar advisory committee of the OPA. Committee is one of four iron and steel industry advisory units created by the OPA to serve as liaison groups between the price-fixing agency and the industry on any problems which may arise with respect to prices.

Other members of the cold-finished bar group are: W. R. Howell, Bliss & Laughlin Inc., Harvey, Ill.; T. L. Kelby, LaSalle Steel Co., Chicago; V. A. Jevon, Jones & Laughlin Steel Corp., Pittsburgh; W. N. Lynch, Keystone Drawn Steel Co., Spring City, Pa.; E. L. Parker, Columbia Steel & Shafting Co., Pittsburgh; and F. C. Young, of Union Drawn Steel Division, Republic Steel Corp., Massillon, O.

NOT - *How much can be*

IN 1895, James Hartness, designer of the Jones & Lamson Flat Turret Lathe, told a friend: "Our method of selling was to go into a plant, compute their present costs, and say that we would send a machine, on trial if necessary, and they could send us the savings per month. On this basis we sold many machines, but it soon reached a point where that was not necessary, for people knew what could be accomplished."

JONES & LAMSON

Manufacturers of Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Automatic Opening Threading Dies and Chasers

No. 3 Jones & Lamson Ram Type Universal Turret Lathe with standard bar equipment.

saved, but-

HOW MUCH MORE?

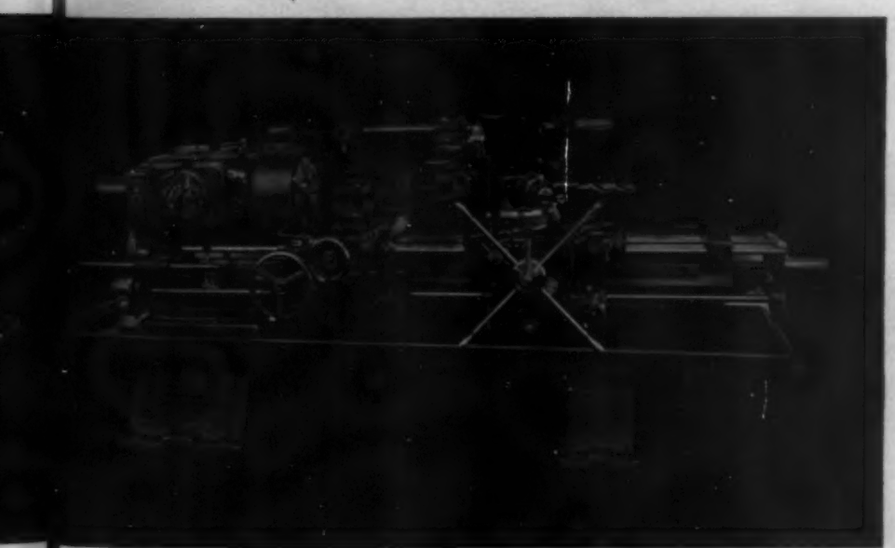
THE flat turret lathes of '95 developed by James Hartness are made no longer, but new Jones & Lamson Turret Lathes — faster, more precise, more rigid and easier to operate than ever — are paying for themselves *over and over* out of savings.

No longer does a skeptical world demand such money-saving equipment from its makers on trial. The big question today is not how much can be saved by Jones & Lamson equipment, *but how much more* when equipment and production plans are co-ordinated by Jones & Lamson methods.

That is why progressive manufacturers habitually put their production problems up to Jones & Lamson engineers. That is why such plants, planned and equipped to meet today's emergency, will be in strategic position to face the harsh competition that is bound to follow this upheaval.

Why not see what Jones & Lamson engineering and Jones & Lamson machines can do to put your plant in such a strategic position? Inquiries from large concerns or small receive thorough, detailed study here, and illustrated catalogs are available.

MACHINE COMPANY - *Springfield, Vermont, U.S.A.*



7A Jones & Lamson Saddle Type Universal Turret Lathe with standard chucking equipment.

SADDLE TYPE UNIVERSAL TURRET LATHE

FAY AUTOMATIC LATHES

AUTOMATIC OPENING DIE HEADS

J&L

PROFIT PRODUCING MACHINE TOOLS

Industry Committees To Speed Ordnance Production Organized

WASHINGTON

WAR DEPARTMENT announced formation of eight committees in the ordnance field to serve as the means for exchange of information, parts, raw materials, and other resources within an industry for the purpose of obtaining maximum final production in a minimum of time.

The committees have been in process of organization since April 21, under the supervision of Major General Levin H. Campbell Jr., the Chief of Ordnance, Service of Supply.

Delays in final production occasioned by the lack of a relatively few special parts have been markedly decreased as a result of the formation of the committees, which offer a mechanism for pooling the full resources of each industry to produce maximum capacity.

Industries now covered by the organization of the committees include manufacturers of mechanical time fuzes, carbines, 37 mm. tank and antitank guns, M 1903 rifles, caliber .45 pistols, steel cartridge cases, caliber .30 and .50 metallic belt links and caliber .30 M1, rifle clips. The Ordnance Department plans to form additional committees in other industries as need arises.

Each committee operates under the direction of Major General T. J. Hayes, Chief of Industrial Service, Ordnance Department, or one of his division chiefs. A representative of the industry serves as assistant chairman. The committees are composed of a cross-section of representative plant executives and vary in size according to the needs of the individual industry.

Through the committees, the affected industries exchange information on improved methods of manufacture, thus giving the benefits of research and developments of each company to the whole industry. Raw materials, key parts and other items going into production are shifted from one plant to another, an exchange system which makes for the quickest use of supplies.

As an example of the co-operative arrangement, if a manufacturer has a product in almost finished form and needs one or two parts, of which he has no available supply, another manufacturer, possessing these parts but having no immediate need for them, will supply the parts. Similarly, if plant "x" has a surplus of a certain type gear and if plant "y" has an immediate need for such gear, the committees arrange for the transfer of the gears from plant "x" to plant "y." The exchange of machine tools has been particularly successful.

When it is realized, for example, that 115 parts are used in the manufacture of a finished mechanical time fuze, the importance of this exchange may be appreciated.

Problems of manufacture are discussed at meetings of the committees and the full force of the industry's resources is thus brought to play in solving these problems on a co-operative basis. The Army arsenals are co-operating fully, both in research and in the exchange of equipment and parts.

The committee operation is purely voluntary within an industry, the detailed work being done by industry executives under the guidance of the appropriate ordnance officers.

The industry representatives are chosen by the Chief of Ordnance

War Expenditures Since Middle of 1940 Exceed Thirty Billion Dollars

WASHINGTON

A TOTAL of $30,615,000,000 has been laid on the line by the federal government for the prosecution of the war since intensive military effort began in the middle of 1940, according to WPB compilations.

This sum was paid out by the Treasury and Reconstruction Finance Corp. over a 23-month period beginning in July, 1940, and ended May 31, 1942.

Expenditures in May come to $3,853,000,000—two and one-half times the figure for November, the month before Pearl Harbor, and more than four times expenditures in May, 1941.

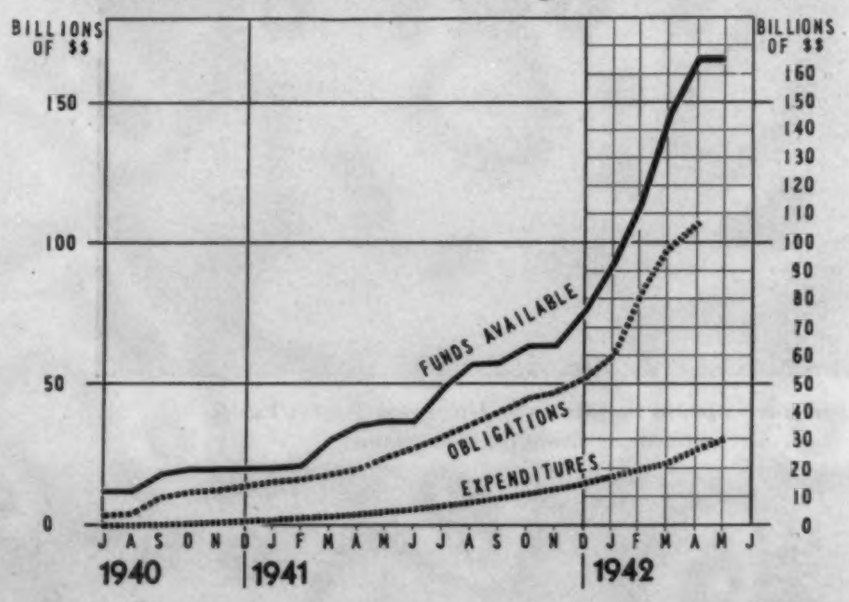
No additional funds were authorized by Congress for the war program during May, and the total of $166,435,000,000 (revised) remained the same as at the end of April.

Contracts and other commitments for war activity in April, the latest month for which such figures are available, amounted to $9,906,000,000. This compares with contracts and other commitments of $16,395,000,000 in March, and $20,932,000,000 in February, when war contracting reached a peak. At the end of April, 35 per cent of the funds programmed, or $58,259,000,000 remained to be placed under contract.

Average daily rate of war expenditures in May rose to $148,200,000, a gain of 10 per cent over the April rate.

This compared with an increase in spending in April over March of 12 per cent; March and February each recorded monthly rate increases of 21 per cent.

United States War Financial Progress—Cumulative



after consultation with the pertinent industry.

Following are the representatives of industry who serve as assistant chairmen of the committees:

Mechanical Time Fuze Committee: Roy T. Hurley, factory manager, Eclipse Machine Division, Bendix Aviation Corp., Elmira, N. Y.

Carbine Committee: D. M. Fincke, assistant works manager, Underwood-Elliott-Fisher, Hartford, Conn.

37 mm. Tank and Anti-tank Gun Committee: Wilson Palmer, United Shoe Machinery Corp., Beverly, Mass.

M 1903 Rifle Committee: G. O. Clifford, Remington Arms Co., Ilion, N. Y.

Caliber .45 Pistol Committee: G. K. Howland, Remington-Rand, Inc., Syracuse, N. Y.

Steel Cartridge Case Committee: C. L. Patterson, Corcoran-Brown Lamp Division, Electric Auto-Lite Co., Cincinnati.

Caliber .30 and .50 Metallic Belt Link Committee: W. A. Baker, Firestone Steel Products Co., Akron, O.

Caliber .30, M1, Rifle Clips Committee: R. B. Briton, Stanley Works, New Britain, Conn.

Roosevelt Names Members of National Railway Labor Panel

President Roosevelt last week appointed nine members to a National Railway Labor panel created by executive order recently. Chairman is William M. Leiserson, who will select three members of the panel to serve as an emergency board to investigate and to report to the President on any dispute which a carrier and its employes have been unable to settle.

Members of the panel in addition to Chairman Leiserson: William H. Spencer, dean, University of Chicago; Judge Walter P. Stacey, Raleigh, N. C.; Judge Wiley Rutledge, associate justice, United States court of appeals, District of Columbia; Dr. Edwin E. Witte, University of Wisconsin; Walter T. Fisher, Chicago attorney; John A. Lapp, Chicago; John A. Fitch, New York School of Social Work; and Norman Ware, member of the Connecticut Board of Mediation and Arbitration.

New Jackson, O. Blast Furnace Is Blown In

Jackson Iron & Steel Co., Jackson, O., blew in its new Jisco blast furnace last week. Miss Anna Davis, sister of D. D. Davis, president of the company, who lighted the old stack in 1908, applied the same torch to the new stack. This unit is of modern design, with capacity increased 25 per cent. Dismantling and erection was done by the William B. Pollock Co., Youngstown.

Black Out Plan for Steel Mills Causes Little Loss in Production

PLAN for blacking out steel mills in case of air raid alarms has been worked out by Carnegie-Illinois Steel Corp. and is being transmitted by the War Department to the industry in general through the American Iron and Steel Institute.

The sky-glow and frequent leaping flames which characterize steel producing centers, and which have been a source of concern to defense officials, would be minimized by the plan. No guarantee is given that the plan would result in a complete blackout of the mills, but it is believed sky-glow can be reduced greatly and that leaping flames can be eliminated.

No substantial loss of production would result from the plan, according to steel mill officials.

Night Glow Worst Problem

Technical details of the plan follow:

COKE PLANTS: In coke plants it is possible to stop work for as long as an hour without noticeable loss of production. Coke ovens not "pushed" on schedule may make up production through an increased rate of charging later on, after the emergency. The coke-pushing operation is responsible for the glow of light from the high-temperature coke and the subsequent steam formed during the quenching operation. Both are highly visible at night.

BLAST FURNACES: Normally, in blast furnace operation, furnaces are cast on a 5 to 6-hour cycle. When advance warnings are received it is possible to delay the casting operation by at least an hour through reducing the amount of air blown into the furnaces.

This procedure insures elimination for the period involved of visual illumination from hot metal, slag or burning gas. Any hot metal or slag in ladles at the blast furnace will be covered with coke dust and this would immediately and adequately eliminate any glow from this source. Pig iron operations would be stopped immediately with all hot pig iron immediately quenched below the glow point.

BESSEMER CONVERTERS: A normal bessemer converter operating cycle lasts from 10 to 20 minutes. In case of an air raid alarm, the converter can be emptied and the vessel turned nose down to eliminate glow from the vessel itself. Where necessary the nose of the vessel can be mudded and bricked up or otherwise covered. Hot metal in ladles can be held under covers and where necessary covered with coke dust. Hot steel in ladles will be released immediately into molds and the tops covered. Ladles which still are glowing will be moved under cover. Any glow from cinder pans would be immediately dissipated by spraying with water.

OPEN HEARTHS: Normal open hearth operations require a cycle of 10 to 12 hours, with the duplex process requiring less. In case of an alarm, steps can be taken to "black" the furnace, or in other words, delay its tapping time. This can be accomplished in a number of ways, including reducing the amount of fuel and making certain additions to the metal in the furnace.

In addition, wicket holes and other openings in the furnace can be mudded up and bricked where necessary. In event a furnace has been tapped, the hot steel will be immediately poured into the molds and the tops of the molds covered where necessary. Any hot mold in the yard will be placed under cover. Empty ladles which are still glowing can be tilted toward the furnace wall.

SOAKING PITS: Hot ingots that have been stripped will be charged immediately into the soaking pits, and the drawing of the heated ingots for the mills will be stopped. All soaking pits will remain covered and the gas reduced or cut off as required.

MILLS: Upon receipt of an alarm, mills will cease drawing heated slabs, blooms or billets. Gas in the furnace will be reduced or shut off, and openings in the furnace will be mudded or bricked up. Hot steel in the mills will be rolled and held under cover on the hot beds.

Otis Steel Sale To Be Consummated June 30

Plan for sale and liquidation of Otis Steel Co., Cleveland, will be consummated June 30, and on July 1 the company will be dissolved and liquidating distribution made to Otis shareholders, E. J. Kulas, Otis president, said in a letter to stockholders last week. The Otis company is being sold to Jones & Laughlin Steel Corp., Pittsburgh.

Shareholders have been asked to send Otis shares to the National City Bank of Cleveland, which will act as corporate agent in making the distribution.

Courtesy The Jacobs Manufacturing Co., Hartford, Conn.

HARDEN 700 PER HOUR

with this new heat-treating process!

● Heat-treating outputs are being multiplied two-fold, three-fold and more by TOCCO—the new simplified electric induction heat-treating process! In fact, output of the drill chuck part shown above *was multiplied seven-fold!*

Where former methods required many man-hours, several operations and much scattered equipment, the TOCCO machine performs the complete hardening operation in *a matter of seconds*—with a push-button start and automatic precision control. *Doesn't require skilled labor.*

Where former methods heat-treated the whole part, TOCCO *localizes hardening* at the wearing surface—keeps the core tough—minimizes distortion, *eliminates straightening and rejects.*

Can be installed in assembly line because it is so cool, clean and compact (only 7 ft. x 5 ft., maximum).

For post-war production, too. Just change work fixture to adapt to peacetime products.

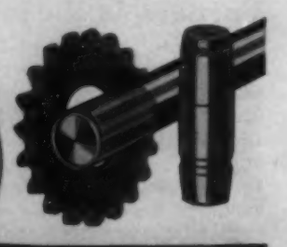
See how TOCCO can *speed up* and *improve* your output!

THE OHIO CRANKSHAFT COMPANY
Cleveland, Ohio

SPEEDY ELECTRIC HEAT IS GENERATED WITHIN THE SECTION TO BE HEAT-TREATED

TOCCO

World's Fastest, Most Accurate Heat-Treating Process



By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

Detroit industry characterized as "pacemaker of difficult war jobs" by WPB chairman . . . Labor shortage expected to develop when area reaches peak of production next year

DETROIT

MAKING his first visit to Detroit war plants, Donald M. Nelson, production chief of the nation's war effort burst into town Saturday, June 6, in company with Oliver Lyttelton, British minister of production, Averill Harriman, lend-lease expediter in London, W. S. Robinson, representative of the Australian government, and E. C. Kanzler, head of the WPB Detroit office. The party was rushed through the Ford Willow Run and airplane engine plants, and later through the Chrysler Tank Arsenal. About 5 p. m. they filed into a packed press conference, surprisingly sprightly of step considering their arduous schedule.

Wiping a perspiring brow, Mr. Nelson asked Capt. Lyttelton for a few words. The latter observed that the day was the "most thrilling in his life", that we were all now in the business of "Anglo-American exports to Germany" and that "business was fine". Mr. Nelson impressed reporters with his ready answers to all questions, his engaging personality and friendly responses being all the more remarkable because of the intense pressure under which he works.

Nelson explained he and Lyttelton were now engaged in "gearing production to strategy" and eventually it might mean quick shifts in emphasis on production of various war products, even to the point of disrupting schedules in force. He foresaw a doubling of present production by 1944; indicated present expenditures for war products was at the rate of 48 billion dollars a month; reported merchant shipping output ahead of schedule; and commended the energy and enthusiasm of the automobile industry in undertaking war production.

Detroit Industry Converted

In answer to a question by this observer as to the progress of industry conversion to war production, he said that certainly in the Detroit district the job was done completely, but in the country at large conversion still could be carried a little further.

He explained the order suspending new plant construction as being occasioned by two facts: (1) Capacities of completed plants have greatly exceeded original estimates; and (2) it is improvident to waste vital materials in new plants if they are not immediately necessary.

The automotive industry is capable of tackling and licking the toughest kind of production jobs in the entire war effort, Nelson pointed out, thereby leading WPB officials to the conclusion the best policy may be to move "tough" jobs in here and remove some of the easier production tasks to other districts. Detroit industry was characterized as the "pacemaker of difficult war jobs."

Coincident with Nelson's appearance here, the local WPB office released figures showing 524,000 were employed in manufacturing industries in the Detroit area in May, while 660,000 would be employed by November. New estimates of employers indicate that when the war peak is reached, in 1944, 746,000 employes may be required. Thus, in the next 18 months there may be a demand for 220,000 more employes. Considering the unemployment, draft requirements

Production Chiefs Visit the Fords at Willow Run

OFFICIALS of the United Nations in charge of speeding up the war effort last week inspected the Ford Motor Co.'s Willow Run, Mich., bomber plant. Left to right: W. Averill Harriman; American lend-lease official; C. E. Sorenson, Ford general manager; WPB Chairman Donald M. Nelson; Henry Ford; Oliver Lyttelton, British Minister of Production; William S. Robinson, Australian official; Ernest Kanzler, WPB chief at Detroit; Edsel Ford, president, Ford Motor Co. NEA photo

and additional women going into war plants, a shortage of about 157,000 at peak is envisioned. However, many factors now unseen may react to affect this total drastically, one way or the other.

It was a foregone conclusion someone would ask Nelson about the prospects of gasoline rationing in the Middle West. To the question he threw up his hands and said he had no statement to make, adding that too much had been said already about the gasoline and rubber situations and that a complete statement would be forthcoming from the White House shortly.

As of Wednesday last week, no statement had yet appeared, but certain straws in the wind lead to the conclusion there will be no gasoline rationing forthcoming by virtue of developments which will guarantee "interim tires" for civilian automobiles. Nothing official has been released to this effect, but the tire committee of the War Engineering Board of the Society of Automotive Engineers, including technical representatives from the motor industry, tire industry and chemical industry have been probing into the matter of interim tires for a good many weeks now, and their reports are being submitted to a civilian branch of the government in Washington. They represent a pooling of the best technical brains in all these industries.

Informed opinion cites the likelihood of two major approaches. The first is the supply of a suitable material for retreading worn tire casings to make them serviceable for 5000-10,000 miles. Several such materials are past the development stage and can be put into production readily. One such is Thiokol "N", a synthetic produced by Thiokol Corp. in the plants of Dow Chemical Co., Midland, Mich. Thiokol is a product of the mixture of sodium disulphide and ethylene dichloride, with subsequent further treatment. Originally it was produced in a Trenton, N. J., plant, but operations were transferred to Midland in 1938. It has been used widely in several grades by industry, particularly where resistance to hydrocarbons was essential. Grades A, B, C, D, F and FA have been supplied; the new grade for tires will be designated N.

Compares with Camelback

Retreads of Thiokol, firmly bonded to tire casings by heat and pressure, should be comparable in price to those of the present camelback (mixture of reclaimed and natural rubber), from $6 to $8 per tire, according to Dr. Willard H. Dow, president of Dow Chemical, quoted in an article in *The Detroit News* for June 5. Expansion of the present plant at Midland, estimated to cost $1,000,000, virtually could guarantee continuous production of Thiokol sufficient to retread 1,000,000 tires a month by late summer, he said. It may even be possible to paint, dip or spray the Thiokol liquid latex on a worn casing and obtain satisfactory service.

Breaking of the Thiokol N story in Detroit was something of a minor bombshell. Follow-up statements by engineers, traffic experts and whatnot attempted to minimize the importance of the development, claiming entire output would be requisitioned by the Army. This is not believed likely, however, as the product may not be "good enough" for military vehicles, and anyway the country's entire stockpile of natural rubber is being reserved for military equipment.

Thiokol is said to be just one of several materials being tested for retreads of civilian tires, although the importance of Dow Chemical Co. and the fact Dr. Dow personally publicizes claims for the material suggest it may be the key material for eventual use.

The second approach to the interim tire is a little bit further away and centers around development of a new synthetic tire which can be produced with present plant equipment, involving no new construction and no requirement for scarce material such as steel plate. Such a synthetic is no idle dream. It supposedly is based on a butyl rubber, basic ingredients of which can be supplied by oil companies from cracking equipment which is now standing idle because it has been supplanted by a more modern type. Here again, the tire to be produced would be a Victory brand and would suffer in quality even compared with synthetics now under way. Thus it would be strictly for civilian use, with military requirements amply supplied by the butadiene and buna S programs, the latter incidentally now appearing to have much greater potentialities than first imagined.

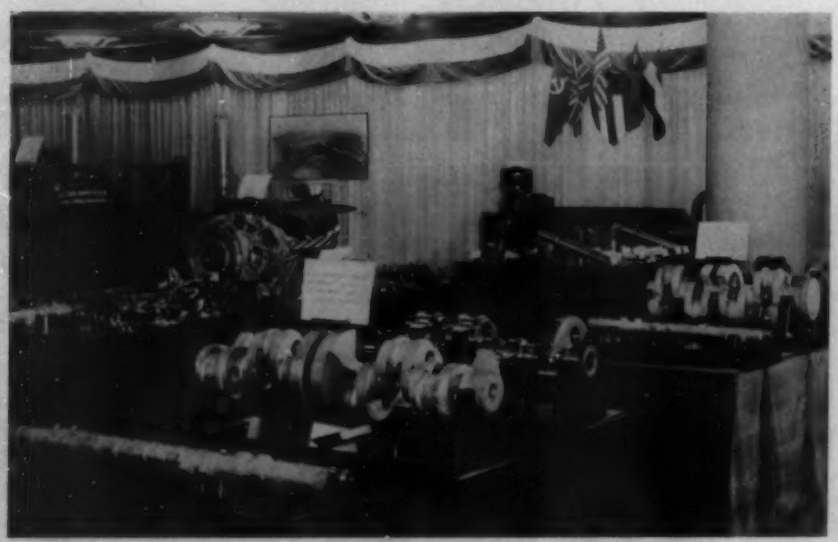
May Solve Problem

So if retreads are to be available by fall, to be followed by a new synthetic, the tire problem—if there really is any tire problem at the moment—seems well on the way to solution. Another medal can be struck off for the ingenuity and tenacity of American oil, rubber and chemical engineers. Concrete realization of their achievements automatically will relieve the necessity for gasoline rationing, although common sense still dictates the most careful sort of conservation of rubber now on automobiles.

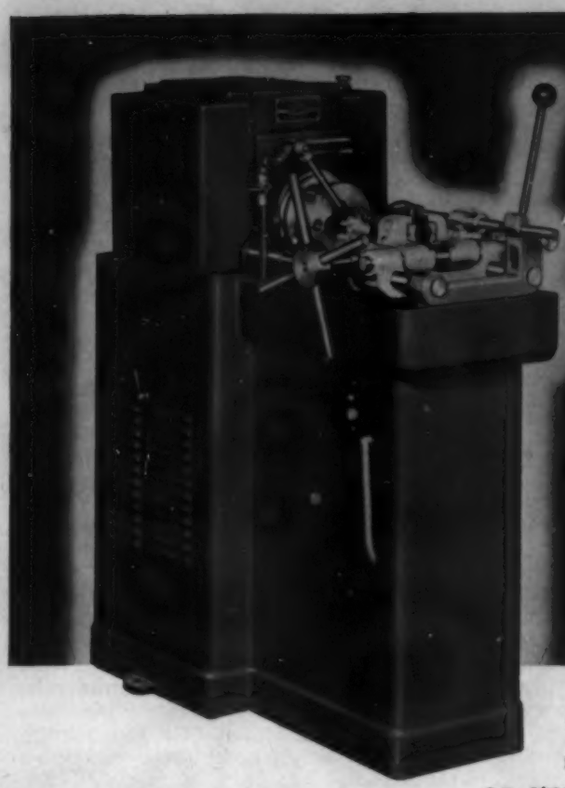
One of the largest industrial mass employment and training programs ever launched has been announced by Chrysler Corp., in connection with its new Dodge-Chicago aircraft engine plant. As a preliminary step top production executives, totaling over 50, are now being selected. They will start their training by going to the Chrysler headquarters in Detroit, where they will study policies and war products. Further training will take the form of actual shop work in plants located throughout the country now doing the particular type of operations these executives will supervise.

With this nucleus, plus some 250 carefully trained instructors, an or-

(*Please turn to Page* 50)



CAST steel crankshafts and camshafts, not so long ago innovations for automobile engines, now have been developed by Ford engineers for new airplane and tank engines. They were included in an exhibit of war products sponsored by Ford last week in Detroit at the Rackham Educational Memorial. In the left background is a disassembled Mitsubishi 14-cylinder radial engine from a Japanese plane shot down at Pearl Harbor



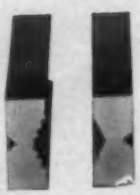
OSTER

"RAPIDUCTION JUNIOR"

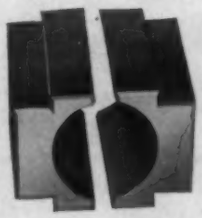
. . . for Fast, Accurate Threading of Bolts, Rods, Studs, Pipe, and Nipples

"RAPIDUCTION JUNIOR" is a low cost, high speed, threading machine. It has wide application on standard and special threading jobs. Its revolving, self-closing die-head and open-type vise facilitate the handling of stock in and out of the machine.

Here's a sample of its *per hour* performance: 500—3/8" bolts or studs of screw stock threaded one inch on one end every hour.



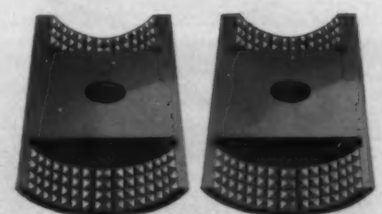
Standard vise jaws which are reversible for holding either round or square stock or hex head bolts.



Smooth inserts for holding stock which must not be marred. (One set necessary for each size—extra equipment.)

Illustrated at left and below are the various types of vise inserts which can be supplied with the "RAPIDUCTION JUNIOR". The machine is made in two sizes: No. 541 with a bolt range of 3/16" to 1-1/4" N. C. or Whirworth; 3/16" to 1-1/2" N. F. or B. S. F.; and No. 542 with bolt range of 3/16" to 1-1/2" N. C. or Whitworth; 3/16" to 1-3/4" N. F. or B. S. F. Both models have a regular pipe and nipple range of 1/8" to 1-1/4". Full details on request. Use form below.

Illustrated below are threaded inserts for holding threaded end of short nipples; each set holds two sizes: (1/4" & 3/8") (1/2" & 3/4") (1" & 1-1/4")—extra equipment.



Diamond point inserts for gripping plain ends of short nipples; each set holds two sizes (1/4" & 3/8") (1/2" & 3/4") (1" & 1-1/4") —extra equipment.

THE OSTER MANUFACTURING COMPANY
2037 EAST 61st STREET • • • CLEVELAND, OHIO, U. S. A.

( ) Send complete description of "RAPIDUCTION JUNIOR" Threading Machines.

( ) Give name and address of your distributor in my area.

NAME .....

ADDRESS .....

CITY ..... STATE .....

Mail This—

Mirrors of Motordom

(Continued from Page 48)

ganization numbering tens of thousands will be assembled and trained so the entire personnel will have completed its education by the time the new plant is ready to start production some time next year. John Haien, director of war plant training for Chrysler, states, "It is likely that more new, skilled manpower will have entered the ranks of industrial professions and vocations through the operations of the Dodge-Chicago aircraft engine plant than has ever before resulted from a single war project."

Faced with the exhaustion of the supply of heavy-duty trucks for civilian use, Chevrolet has launched a campaign through its dealers to perfect the quick conversion of medium trucks so they can pinch-hit for the heavier hauling units. One example of such a conversion is a highway tanker with original capacity of 14,000 pounds gross weight. By addition of a tandem drive rear end special transmission and tandem semitrailer the unit now handles a load of 56,000 pounds.

As an example of the co-operation between established aircraft engine manufacturers and automobile companies undertaking aircraft engine manufacture, one of the leading engine builders estimates it has spent the equivalent of 90-100 *man-years* in engineering consultation with automobile company production experts and engineers. Since 1940, one auto company had 118 engineers spending 192 days in consultations; another had 220 engineers spending 333 days; a third dispatched 375 engineers for a total of 504 days; and a fourth had 129 men spending 181 days. Small wonder that by the end of 1943 it is expected close to 30,000 engines a month of this company's design will be rolling from production lines all over the country.

Several thousand attended the meeting and exhibition sponsored here Monday by the Society of Automotive Engineers, Engineering Society of Detroit and Ford Motor Co. W. G. Ovens, Wright Aeronautical Corp., Paterson, N. J., discussed design features of a Japanese Mitsubishi engine shot down at Pearl Harbor, the engine components being on display at the exhibit. He indicated the group responsible for the design did an ingenious job of combining what they apparently believed to be the most desirable features of a number of products of foreign manufacture—all proved features. These features were built into a composite design of the sort that "has to work the first time"—and probably did. He added that manufacturing methods and equipment of manufacturers whose features were appropriated probably were used to produce parts of quality comparable to the originals; and that the available "heavy industry" equipment probably influenced both the design and finished parts peculiar to the engine. He concluded the Jap engine was undoubtedly a highly dependable, even though not highly developed, piece of equipment, likely produced under time and tooling limitations which industry in this country would consider nearly impossible.

First examining psychological factors essential to the war effort, T. P. Wright, assistant chief, aircraft branch, WPB, proceeded to elaborate on the five M's of production —material, management, machines, metals and men. On the management score, he referred to the im-

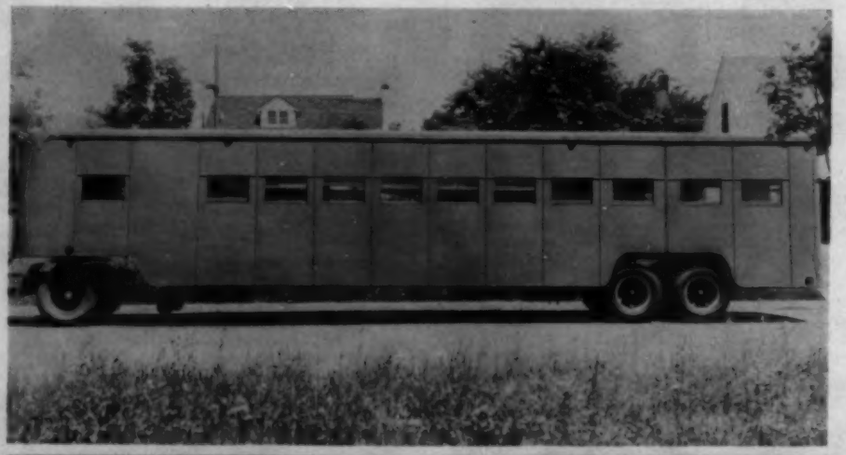
136-Passenger Bus Designed To Save Steel, Rubber

A bus 43 feet long, with capacity for 136 passengers, designed and built by Ohio Body Mfg. Co., Ashland, O., for mass transportation of employes to war plants was demonstrated in Ohio cities last week. It is a trailer, the front end being locked to a 1½-ton tractor. Rear of the bus is supported on eight tires; tractor on six. Company representatives stated bus and tractor complete require only nine pounds of rubber per passenger, compared with 22 to 28 in conventional types of passenger bus.

Chassis is a standard welded frame of wide-flange, 10-inch I-beams to which semitruss type outriggers supporting the floor have been welded at right angles. Rear end is mounted on two trunnion-type axles in tandem, lower photo, with the four sets of double wheels cushioned by special springs. Dismounted, the front end is propped up by standard vertical support column resting on two small steel wheels.

Frame for sides and roof is of light, cold-rolled pressed steel sections covered with a skin of 26 gage steel sheets bonded to ¼-inch plywood. All metal from floor up is high tensile steel. The floor is a ⅝-inch phenol-bonded plywood surfaced with a ⅛-inch thickness of Masonite.

Method of assembly was to weld the body and chassis separately, then bolt the two parts together.



portant work of the Joint Aircraft Committee in Washington, composed of two men from the Army Air Forces, two from the Bureau of Aeronautics, two from the British Air Commission and two from the WPB.

The committee has been meeting every week for a year and a half and has jurisdiction over all matters pertaining to the allocation and standardization of aircraft.

Mr. Wright said that hours of work per week in aircraft plants now average about 50 per employe, with plant utilization (total man-hours divided by number of workers on the first shift) approximately 110 hours for engine and propellers, 88 for airframes. He added a comforting note on production, stating total United Nations' airplane output is now 27 per cent ahead of that of the Axis powers, and by a year from now will outstrip the enemy by 2 to 1.

Col. A. W. Herrington, president of the Society of Automotive Engineers, and recently returned from a U. S. mission to India, spoke briefly and among other comments said signicantly: "Our nation is approaching its destiny. We are fated to be the leaders of the new world. The time has come for us to assume this leadership, and our hope and prayer must be that we are worthy of it, and that we are willing and able to lead the world forward in a full recognition of the rights of free men everywhere. There can be no peace hereafter unless we now recognize that the principle of empire and the economic exploitation of the rights of peoples must be brought to an end. We will fail in our leadership unless we proclaim to all that the system which we envisage after the war will abolish for all time the discrimination between people because of their race, creed or color."

Industrial Salvage Campaign Aimed at All Dormant Material

DETROIT

CHARLES H. McARTHUR, chief, Industrial Salvage Section of the War Production Board, said in Detroit last week that the automobile industry has made a commendable effort in the organization of its industrial salvage program, by which it is hoped to move every pound of dispensable material into war production channels. Tools, dies, molds, obsolete machinery, equipment, even buildings, will be examined in the light of their value for the war effort, and decisions made by salvage authorities with each company whether or not to dispose of them.

Re-examinations will be periodic after the initial housecleaning effort. Detailed reports will be made monthly to the Automotive Council for War Production by the 1000 or more plants participating in the program.

In determining the salvage value of nonproductive materials and equipment, salvage authorities are guided by a number of recommendations made by the committee directing the work. Some of these are:

1. If the equipment is designed for production of an essential part, decision as to its disposal should be based on an honest attempt to weigh the relative importance of its potential values to the nation as scrap and as an existing tool.

2. In determining such values on what material is obsolete, it should not be forgotten that the rate of turnover will undoubtedly be lowered by wartime curtailment of car use; for although the exigencies of the emergency will extend the life-span of the average motor vehicle, the same exigencies will tend to lower the rate of wear.

3. The existence of duplicate sets of equipment, such as dies, should be considered also in arriving at decisions. If the company can fulfill its responsibilities to the car-using public by retaining one set of dies, duplicate sets should be disposed of.

4. Obsolete or obsolescent equipment held for companies by suppliers should be reviewed carefully. If possible, it should be ordered scrapped.

5. Parts in the hands of vendors should be investigated with the object of effecting the release of any which should be scrapped.

6. Hairline decisions between balancing values may be called for. As an example, it will need to be decided, in the case of forging dies, whether it would be more beneficial to machine off the working face of the die and use the remainder as the basis of a die for war production, or to scrap the entire die for recirculation through steelmaking channels.

Industry sources state they are unable to estimate the tonnage of iron and steel now dormant in salvageable state in the motor industry. No two companies face the same problems, although most companies for years have carried on constant salvage operations, pursuing the practice of scrapping equipment when its potential usefulness ends. When monthly reports on the program, which opens June 15, are assembled, better approximation of results can be ascertained.

Return to:

Salvage and Conservation Committee
Automotive Council for War Production
New Center Building, Detroit, Mich.

MONTHLY SCRAP DISPOSAL REPORT

For Month of_____

COMPANY_____ PLANT_____

ADDRESS_____

Classification	Weight in Pounds of Scrap Shipped from Plant		
	Production Scrap	Non-Production Scrap (tools, dies, molds, forms, machinery, buildings, etc.)	Total Scrap
IRON & STEEL			
NON-FERROUS METALS			

Weight in pounds of equipment in the possession of vendors which has been released for scrap or other disposal during the period covered by this report:

_____ Pounds

Signature of person making this report_____ (Name) _____ (Title)

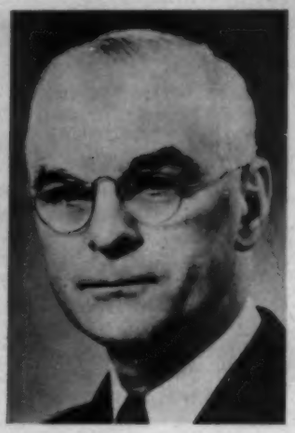
TO accelerate scrap and salvage programs in 1000 plants comprising the bulk of the automotive and parts industries, a program of conservation has been launched, effective June 15. Salvage authorities have been named in each plant, who will submit monthly reports on the above form. Keynote will be a concerted effort to move nonproductive scrap in the form of old tools, dies, molds, machinery, buildings and the like

MEN of INDUSTRY

A. J. Hazlett

V. A. Jevon

J. D. McKnight



E. E. Sanborn

V. A. JEVON and **A. J. Hazlett** have been appointed assistant general managers of sales, Jones & Laughlin Steel Corp., Pittsburgh. Mr. Jevon has been assistant to vice president in charge of sales since October, 1938, while Mr. Hazlett has been manager of the strip-sheet sales department since 1938.

Clarence C. Wehling, associated with Jones & Laughlin's Pittsburgh sales department since 1928, has been named assistant district sales manager at Pittsburgh, and **F. H. Davidson,** associated with the hot rolled sales department since 1936, has become assistant manager of sales of that department.

♦

Dr. E. E. Jensen has been named research assistant in the industrial relations department, Allis-Chalmers Mfg. Co., Milwaukee.

♦

Edgar L. Newhouse Jr., president, Federated Metals Division, American Smelting & Refining Co., New York, has been elected a vice president of the latter firm.

♦

H. D. Hubbs, sales manager, Monmouth Products Co., Cleveland, has been elected treasurer. He will retain his position as sales manager which he has held since March, 1940.

♦

Joseph L. Auer, general works manager, R. Hoe & Co., New York, has been elected vice president and general manager.

♦

Lothair Teetor was elected president and chairman of the board, Perfect Circle Co., Hagerstown, Ind., at a recent meeting of the board of directors. **Ralph R. Teetor** was elected vice president; **Leslie B. Davis,** secretary-treasurer, and **C. Ray Teetor,** assistant secretary-treasurer.

♦

J. D. McKnight has been named manager, Detroit district sales office, Allegheny Ludlum Steel Corp., succeeding **H. H. Arbuthnot,** who has been transferred to Pittsburgh as assistant general sales manager. Formerly assistant manager at Detroit, Mr. McKnight has been associated with Allegheny Ludlum six years.

E. E. Sanborn has been appointed manager of tool steel sales in the Cleveland territory for Allegheny Ludlum. He joined the sales department of Atlas Steel Co. in 1924 and continued with Ludlum Steel Co. when Atlas and Ludlum merged in 1929. Mr. Sanborn has been associated with Ludlum and later Allegheny Ludlum since that time, working in the Cleveland territory during the entire period.

♦

Fred R. Buskirk has been named superintendent, Cleveland coke works, American Steel & Wire Co., succeeding the late W. R. Pendry. He formerly was general foreman at the coke works.

♦

William F. Bailey was recently appointed manager, Porcelain Division, Westinghouse Electric & Mfg. Co., Derry, Pa. The past 16 years he had been auditor of the Switchgear Division, East Pittsburgh, Pa., works.

♦

Henry D. Scott has been elected chairman of the board, Sharon Tube Co., Sharon, Pa. He succeeds his father, the late I. M. Scott. Mr. Scott has been succeeded in the presidency by **Meyer Yanowitz,** heretofore secretary-treasurer, and **R. W. Brown** has been elected secretary-treasurer, succeeding Mr. Yanowitz.

♦

W. G. Peoples, the past four years assistant general traffic manager, Southern Pacific railroad, Chicago, has been transferred to New York as freight traffic manager in charge of the road's freight agencies in the East and Southeast.

♦

Graydon Megan, assistant vice president, Inland Steel Co., Chicago, has been inducted into the Army and is located at Jefferson Barracks, Mo., for basic training. Before joining Inland four years ago, Mr. Megan had practiced law in Chicago.

♦

Clyde E. Weed, formerly general manager of mines, Anaconda Copper Mining Co., has been elected vice president in charge of mining operations, while **Frederick Laist,** heretofore general metallurgical manager, has been elected vice president in charge of metallurgical operations.

♦

Col. Richard Z. Crane, since June, 1938, deputy chief, Detroit Ordnance District, has been recalled to Washington, where he will receive a new assignment with the Ordnance Department. **Col. A. B. Quinton Jr.,** deputy chief of the district from 1934 to 1938, and recently assistant chief of industrial service purchasing in the office of the Chief of Ordnance, returns to Detroit to succeed Colonel Crane.

♦

Harold Cope, assistant general superintendent at the Donora, Pa., steel and wire works of American Steel & Wire Co., has been named division metallurgist at the com-

pany's offices in Cleveland, while **John A. Sienker,** whom Mr. Cope succeeds, has been named superintendent of the steel works in Worcester, Mass. **Loren J. Westhaver,** heretofore superintendent at Worcester, has been transferred to Donora as assistant general superintendent, replacing Mr. Cope.

♦

Hans Bohuslav has joined Sterling Engine Co., Buffalo, as vice president in charge of engineering. The past ten years he had been associated with Enterprise Engineering Co., San Francisco, first as chief engineer and later as vice president in charge of engineering.

♦

R. F. Bergmann has been appointed chief engineer, Link-Belt Co., Chicago, succeeding **W. W. Sayers,** who has become consulting engineer. Mr. Bergmann had been assistant to Mr. Sayers from 1933 to 1936, when he resigned to become chief engineer, Rayon Machinery Corp., Cleveland, from which position he now returns to Link-Belt.

♦

Paul E. Chatelain is now in charge of engineering development of the various machine tools being manufactured and to be produced by Wickman Corp., Detroit. Mr. Chatelain is engineer on special assignment for the A. C. Wickman Co. Ltd., Coventry, England.

Howard E. Mills, from 1927 to 1941 associated in executive capacities with National Automatic Tool Co., Richmond, Ind., and the past year a member of the industrial staff of Cramer-Krasselt Co., Milwaukee, has been appointed district sales manager for the Wickman Corp., in charge of the midwestern territory, headquarters in Chicago.

♦

Reginald S. Dean, chief of the Metallurgical Division, Bureau of Mines, Washington, has been appointed assistant director of the bureau. Before joining the Bureau of Mines staff in 1929 as chief engineer of the Metallurgical Division, Mr. Dean held positions in the research departments of American Zinc, Lead & Smelting Co. and Anaconda Copper Mining Co., and was metallurgical development engineer. Western Electric Co.

♦

J. M. Barr, who has been continuing his previous duties as factory manager following his appointment as assistant general manager of Vought-Sikorsky Aircraft in March, 1941, has relinquished these duties to devote his entire time to his new office. **B. T. Taliaferro,** heretofore assistant factory manager, has been named factory manager; **John F. Hemmert,** factory superintendent, has been promoted to assistant factory manager; **Sidney Hexson,** assistant factory superintendent, has become factory superintendent, and **Earle F. Fay,** general foreman of final assembly, has been named assistant factory superintendent.

Hans Bohuslav

R. F. Bergmann

W. W. Sayers

♦

Henry E. Kingman, formerly president, Franklin Management Corp., Boston, has been elected executive vice president and a director, Solar Aircraft Co., San Diego, Calif. **Ray E. Craig,** heretofore operating manager and comptroller, Barker Bros., Los Angeles, has joined the aircraft company as comptroller.

♦

Wilmer M. Wood has been appointed traffic manager, United States Pipe & Foundry Co., Burlington, N. J., succeeding **J. K. Hiltner,** commissioned lieutenant-colonel, Service of Supply, United States Army. **Raymond McCaffrey** is traffic manager in the southern territory for the company.

♦

A. G. Hoppe, since 1936 assistant mechanical engineer in Milwaukee, Chicago, Milwaukee, St. Paul & Pacific railroad, has been appointed assistant to **K. F. Nystrom,** mechanical assistant to the chief operating officer, Milwaukee. **Harry G. Miller,** engineer of tests, has been made assistant mechanical engineer, succeeding Mr. Hoppe. **L. E. Grant,** metallurgist and welding engineer, succeeds Mr. Miller, while **F. O. Fernstrom,** shop superintendent at Minneapolis, has been named shop superintendent at Milwaukee, succeeding **H. R. Abrahart,** resigned. **H. E. Riccius** succeeds Mr. Fernstrom.

♦

W. J. Reagan, for many years assistant open-hearth superintendent, Edgewater Steel Co., Oakmont, Pa., joined the metallurgical staff of Copperweld Steel Co., Warren, O., June 1.

♦

T. E. McWilliams, assistant district sales manager, Kansas City office of Inland Steel Co., will replace **A. C. Roeth Jr.** in the Bar Division of the Iron and Steel Branch, War Production Board, Washington. This change is subject to final approval of the Civil Service Commission, and effective June 15. **Henry Darby** and **Arthur Henderson** will carry on at the Kansas City office for the duration.

James S. Hearons, assistant manager of sales at Chicago for Inland, has been granted leave of absence to serve with the Production Division, WPB, Washington. He will work in a consulting capacity on railroad problems.

♦

Fred G. Gordon, senior filtration engineer, Chicago, was installed as president, Western Society of Engineers at the society's seventy-third annual dinner in Chicago, June 1. **C. Earl Webb,** division engineer, American Bridge Co., was made first vice president; **P. R. Elfstrom,** assistant chief engineer, Chicago North Shore & Milwaukee and Chicago Aurora & Elgin railroads, second vice president; and **T. G. LeClair,** supervising development engineer, Commonwealth-Edison Co., treasurer.

DIED:

Charles George Roser, 55, secretary, Electro Metallurgical Sales Corp., New York, June 9, in Plainfield, N. J. He joined Union Carbide Co. in 1908, and soon became associated with Electro Metallurgical Co., a subsidiary. In 1911 he was made assistant treasurer and six years later when Electro Metallurgical Sales Corp. was formed he was appointed secretary. He was a member, American Iron and Steel Institute.

♦

Hobart S. Johnson, 68, chairman of the board and former president, Gisholt Machine Co., Madison, Wis., May 28. Mr. Johnson was the last surviving son of the late John A. Johnson, who founded the Gisholt plant in 1888, and was an organizer and one-time president, Fuller & Johnson Mfg. Co.

♦

John P. Arnoldy, president and general manager, Warman Steel Casting Co., Los Angeles, June 2, in that city. He had been with the company since 1917, becoming secretary in 1923, general manager in 1925, and president in May, 1941.

♦

H. J. McGill, vice president, Safway Steel Scaffolds Co., Milwaukee, June 3.

♦

John G. Heiss, 57, foreman, grinder department, Standard Tool Co., Cleveland, June 8, in that city. He had been associated with the company since 1906.

♦

Joseph T. Blythe, 57, a founder of Stimson Aircraft Co. and a vice president of Stimson Sales Co., in Toledo, O., May 31.

♦

J. Irvine Lyle, 68, president, Carrier Corp., Syracuse, N. Y., June 7, in that city. A pioneer in the air conditioning industry, Mr. Lyle helped found Carrier Corp.

♦

William Debeaubein, 54, chief inspector of war production materials, Hupp Motor Car Co., Detroit, June 2. He formerly was general superintendent, Pontiac Division, and production manager, Fokker Aircraft Corp., New York.

♦

Sylvester T. Thompson, 49, vice president in charge of production and export, Zenith Radio Corp., Chicago, in Oak Park, Ill., June 8.

Buffalo patriots responded to government pleas for babbitt metal by giving the local salvage organization hundreds of trophies, cups, bowls and plaques, many of which were prizes for athletic games, bridge tournaments, dance contests, poultry shows. Several were from an expert window dresser. Metal will be sold at auction and proceeds used for United Service Organization.

Activities of Steel Users and Makers

TO KEEP present facilities in industrial and central station plants at peak production, a new maintenance program stressing "fewer, shorter and longer-lasting repairs" has been set up by Westinghouse Electric & Mfg. Co. Highlights are regularly scheduled Westinghouse-customer contacts for the purpose of making necessary inspections, inventories, field service, and repairs.

♦

Keystone Carbon Co., St. Marys, Pa., is completing a program of expansion, including plant and production facilities.

♦

Bell Aircraft Corp., Buffalo has leased 1,200,000 square feet of floor space of the Terminal plant of the American Radiator & Standard Sanitary Corp. for the "greater production of fighting planes."

♦

H. K. Porter Co., Pittsburgh, plans to establish a plant in Blairsville, Pa., expanding its facilities in the war effort. Between 150 and 200 men will be employed when the plant is in full operation.

♦

Jansson Gage Co., Detroit, will open its new plant at 19208 Glendale avenue, June 15, two months from the day ground was broken. The plant will be devoted to manufacture of precision block and thread gages for use in war production.

♦

Drive-All Mfg. Co., Detroit, has opened a branch office at 30 North LaSalle street, Chicago. The new office is staffed by Ralph Griffith, manager, Trygve Johansen, Harold Wilson and Bernard Gleeson.

♦

Morrison Machine Products Division of Hardinge Bros. Inc., Elmira, N. Y., has been discontinued. Its products, consisting of collets, feed fingers, pads, form tools and cut-off tools, become a part of the Hardinge line and will be sold under that name.

♦

Rogers Diesel & Aircraft Corp., New York, is the new corporate name of Cummins Diesel Engine Corp. of New York. Organized in 1934 as a distributing organization for Cummins Diesel engines, the company has since enlarged its scope of operations and facilities, and now also represents Enterprise and Sheppard diesel engines, and in addition manufactures gasoline and diesel-driven generator sets and power and pumping units.

♦

Employes of Foxboro Co., Foxboro, Mass., who have completed 25 years or more in its service were guests of the company at a celebration May 26. A jeweled service pin of gold was presented to each of 50 men and women.

♦

American Rolling Mill Co.'s Ashland division recently tied down mill whistles in celebration of "521 production records broken since Pearl Harbor." Illustrating the company's absorption in war work a pamphlet, "Armco Goes To War," has been mailed to employes and friends.

♦

Stahl Gear & Machine Co., Cleveland, signalized its twenty-fifth anniversary recently with an illustrated booklet charting the company's progress from 1917 to the present. Booklet contains an interesting comparison between uses of Stahl products in peacetime and those produced in wartime.

♦

Gisholt Machine Co., Madison, Wis., has opened a branch office in Pittsburgh at 1124 Park building, to serve southeastern Ohio, West Virginia, western Pennsylvania and western Maryland. W. L. Sutherland is in charge.

Tool Builders Announce Plans for Sales in East

A number of machine tool manufacturers formerly represented in New York and New England territories by Henry Prentiss & Co. Inc., who retired from business May 31, have announced arrangements for sale of their products as follows:

Bryant Chucking Grinder Co., Springfield, Vt., appointed W. M. Smith eastern district manager of sales and service. His office will be at Springfield.

Cincinnati Planer Co., Cincinnati, will provide its own sales representation.

Hanchett Mfg. Co., Big Rapids, Mich., has arranged with Giebel Machine Tool Co., 250 West Fifty-seventh street, New York, to represent company's line in northern New Jersey, New York City area and Connecticut, the latter section through a Giebel branch at New Haven. Lynd-Farquhar Co., Boston, will act as agent in the remainder of New England.

Moline Tool Co., Moline, Ill., will sell direct in the New York territory.

National Automatic Tool Co., Richmond, Ind., has opened offices at 1807 Elmwood avenue, Buffalo, and in Room 2902, Commerce Building, 155 East Forty-fourth street, New York.

V & O Press Co., Hudson, N. Y., will sell direct from the main office at Hudson.

Women Operate Cranes, Fire Guns, Bend Tubing

WOMEN who a short time ago thought of a range as a kitchen appliance and of powder as only a cosmetic now are doing the work of men on the firing range at the Army Ordnance Department's proving ground at Aberdeen, Md. They are not limited to light work either, but fill shells with powder and prime them, run heavy cranes to assemble the big guns, and load, clean and fire all types from Garand rifles and tommy guns to the huge railroad guns.

Aberdeen proving ground is another sign of the times—women moving in to replace men for tasks that formerly were considered impossible for them.

AN 18-year-old girl worker, above, operating a 15-ton crane, picks up a 90-millimeter gun barrel

COMMANDING officers at the proving ground inspect the work of an all-girl gun crew, left, as they clean a 90-millimeter antiaircraft gun after firing it

TRIO of girls fire a 40-millimeter Bofors rapid-fire ack-ack, under the supervision of a regular Army officer, left below. NEA photos

PRODUCTION of boat tubing for Flying Fortresses and Ventura bombers at Vega Aircraft Corp., Burbank, Calif., has been speeded up by a machine (right) developed by a Vega employe. Featuring a metal rod with a 360-degree protracting dial and a protracting case, along with a 6-foot flexitape rule, it simplifies bending hollow tubing 1/8-inch to 5/16-inch in diameter. By a former method only men were able to do the work, and of 400 pieces per shift there were many rejects. Now a girl operator bends 1800 in the same period, with few rejects

War Material and Production Problems Handled Realistically At Mechanical Engineers' Meeting

✦

Conservation and substitution receive major attention, but authorities declare "this is a war of design as well as one involving manpower and manufacturing abilities". Sir Louis Beale hails achievements

✦

WITH attention concentrated on problems of immediate importance in the war production program, the semiannual meeting of American Society of Mechanical Engineers drew attendance of more than 500 during three days of sessions in Cleveland. Throughout this meeting, which was held at Hotel Statler June 8, 9 and 10, strong emphasis was placed on salvage and substitution of critical materials. This was dealt with to some extent in every session, and one full morning session was devoted entirely to it.

Principal subjects dealt with during the meeting, in addition to those just mentioned, were: Aviation production, flame hardening, plastics, fuels, industrial education, ordnance inspection, materials handling, railroads, central station power, rubber, and grinding. The session on ordnance inspection was unique in that one of the papers was presented by a woman. The author, Miss Mary R. Norton, associate metallurgist, Watertown Arsenal, Watertown, Mass., dealt with methods of measuring and comparing degrees of surface finish on ordnance work.

Miss Norton showed the system of marking ordnance drawings to specify degree of finish with reference to a standard set of steel blocks carrying the various finishes to which the drafting symbols refer. These blocks can be made up in quantities so that they can be supplied to subcontractors. This system already is in practical use and is a definite step in the direction of general standardization of machined surfaces in terms of smoothness.

Several of the important sessions were in the form of panel discussions. One of these was that devoted to aircraft and aircraft parts manufacture, under the chairmanship of Frederick C. Crawford, president, Thompson Products Inc., Cleveland. At this session Mr. Crawford brought out the fact that the emergency was bringing about widespread re-evaluation of specifications in his industry which is doing away with the prodigal use of scarce materials without reducing the end efficiency of the product.

For example, valves previously were made entirely of heat resisting steel. When this material became hard to get, analysis of conditions under which the valves function revealed that only the heads are subjected to intense heat. With this in mind, the design was changed to permit use of a head of heat resisting steel welded to a stem of steel of less critical quality. Smart design, said Mr. Crawford, already has done wonders in coping with material shortages, and he believes that out of it all will come better and more economical products.

Speaking of this matter of specifications, E. W. P. Smith, consulting engineer, Lincoln Electric Co., Cleveland, made a strong plea for more careful study of the maximum ultimate working life of mechanisms — war materiel in particular. Mr. Smith is convinced that many things are being "overdesigned" to such an extent that their specifications are way beyond any possible service which they will be called upon to give. This goes for parts as well as entire assemblies. It results not only in waste of vital materials but also in waste of time in fabrication. Mr. Smith emphasized that in many cases revisions in the interest of faster and better fabrication can be made immediately without affecting the basic design in any way.

At this same session Russell Franks and W. O. Binder, Union Carbide and Carbon Research Laboratories Inc., Niagara Falls, N. Y., presented a paper on the properties of cold-rolled stainless steels used in aircraft. They presented in graphical form the results of numerous stress-strain experiments.

The main session devoted to material substitution and salvage was that held Wednesday morning. The first part, under chairmanship of L. W. Wallace, vice president, Trundle Engineering Co., Cleveland, was given over to papers by Edwin C. Barringer, president, Institute of Scrap Iron and Steel, Washington,

Howard B. Carpenter, right, assistant vice president in charge of operations, Republic Steel Corp., told about some of the NE steels and other substitutes for critical materials at the panel discussion on material substitution Wednesday. Discussion panel leader was E. L. Shaner, left, president, Penton Publishing Co. F. E. Bliven, second from left, supervisor of salvage, General Electric Co., Erie plant; and E. C. Barringer, president, Institute of Scrap Iron and Steel, were also on panel

H. E. Stocker
Lieutenant Commander, Supply Corps, United States Naval Reserve, Washington, described the need for standards in construction, size and use of materials handling pallets

Mary B. Norton
Associate metallurgist, Watertown Arsenal, Watertown, Mass., reviewed standards on ordnance finishes

William B. Stout
President, Stout Engineering Laboratories, Dearborn, Mich., gave an interesting picture of aviation's future—"a helicopter on every garage"

and F. E. Bliven, supervisor of salvage, General Electric Co., Erie, Pa. The second part took the form of panel discussion led by E. L. Shaner, president, Penton Publishing Co., Cleveland, who is editor-in-chief of STEEL.

Mr. Barringer bore down on the fact that the role played by the scrap dealer is far more important than generally is realized. By getting at obscure sources of scrap, gathering, processing and classifying it, and making it available to users in ready-to-melt form, the dealer is expediting the scrap program to a degree which otherwise would be impossible.

This speaker predicted that the scrap industry this year can and will produce the estimated 24,000,000 tons of outside scrap needed by the steel mills this year. This is approximately the tonnage shipped last year—of which 15,300,000 tons went into open hearths, 4,800,000 to foundries, 1,700,000 to electric furnaces and 1,600,000 to blast furnaces.

In 1941, 4,000,000 tons of scrap came from the railroads; 10,000,000 from industry was what Mr. Barringer called "prompt" scrap and 7,500,000 tons from maintenance and obsolescence operations. The balance came out of inventory.

He pointed out that while railroads probably will account for only 2,000,000 tons of scrap this year, war plants will make up the difference. It is found that scrap losses on war materiel production commonly are running about 25 per cent—and in some cases as high as 66 per cent—as compared to normal peacetime losses of around 13 per cent. Mr. Barringer called attention to the fact that scrap yards should not be overlooked as emergency sources of shapes, plates, rails, etc., at this time. Long delays because of priorities on new materials can be avoided if the necessary items can be found as used material.

Mr. Bliven dealt with the so-called "Erie Plan" of industrial conservation, the success of which has caused it to be used as a model for similar plans throughout the country.

Like the principal character in Dr. Russell Conwell's fantasy, "Acres of Diamonds", the industries of Erie, Pa., have found hundreds of tons of valuable material literally in their own backyards—now that they really are hunting for it in a logical way.

This speaker dealt not only with the sources of scrap which had been uncovered, but also the surprising amount of usable rails, shapes and plates that came to light in buildings which had been converted to new uses. He cited the case where a quantity of badly needed steel beams were found lying on a roof where long ago they had been placed to hold down roofing during a windstorm.

He also told of the great quantity of similar material which was salvaged intact from a foundry building converted into a production shop. In this case a lot of heavy structural material—entirely useless under the new conditions—came to light when the building was studied critically. This included a "cat walk" which originally had played a part in supporting a heavy crane. This was found to embody an underlying structure of rails. The whole thing was removed, to the benefit of the building as a factory structure, and yielded many tons of material which the company was about to seek on the outside. Mr. Bliven mentioned that under the Erie Plan full use is being made of scrap dealers in the disposal of material not reabsorbed within a company's own precincts.

He also emphasized the importance of segregation of alloy chips, etc., right at the machine tool. In this connection he urged that machine tool builders, in tooling their machines, give more attention to chip breakers on the tools themselves. This is of particular importance when individual conveyors are attached to the machines, as their mechanisms are incapable of handling long, curling chips.

Representing the machine tool industry on Mr. Shaner's panel was Tell Berna, general manager, National Machine Tool Builders' Association. As an example of co-operation in his industry, Mr. Berna stated that within six weeks after aulminum restrictions went into effect, machine tool builders reduced their use of this metal by 85 per cent. They also have effected great savings in copper by substituting steel tubing and steel fittings in hydraulic systems.

Mr. Berna drove home the point that in all this talk of conservation, the needless losses in operating efficiency of existing machine tools are being lost sight of. He made the flat statement that critical review of loading, unloading and operating technique on machine tools throughout the United States would result in at least 30 per cent greater output without additional units. In this he was backed up by E. W. P. Smith of Lincoln Electric who said that his

own studies of welding practice lead to the same conclusion.

At this point in the program a high official of the Navy Department urged that on machine tools designed for use on board warships, serious consideration be given to welded steel legs and bases. Wartime experience has brought out the fact that bomb explosions or even the shock of broadside firing tend to crack cast beds and legs.

Another contributor to this panel discussion was Howard B. Carpenter, assistant vice president, Republic Steel Corp., who dealt with the capabilities and possibilities of the NE (National Emergency) steels covered to considerable length in the June 8 and June 15 issue of STEEL and which will be given still further consideration in succeeding issues. Mr. Carpenter urged that special attention be paid to the heat treating of these steels, as virtual absence of nickel makes them sensitive to what otherwise would be inconsequential variations in time and temperature in the treatment.

Robert A. Wheeler of the Industrial Salvage Section, Bureau of Industrial Conservation, told of the many phases of this bureau's activity, with emphasis on design simplification, as well as substitution and salvage, as means of "stretching" available supplies of critical materials.

Mr. Wheeler was not the only authority who bore down heavily on the importance of design. At a luncheon meeting on Wednesday, William B. Stout, president, Stout Engineering Laboratories, Dearborn, Mich., made the statement that the United Nations not only must outproduce, but also must "outdesign" the Axis powers—Germany in particular—if the war is to be won in the shortest possible time. As a case in point he mentioned that German engineers have succeeded in meeting aircraft fuel deficiencies by developing motors which do not require the high octane gasolines which we have assumed to be indispensable.

That America is not to be outdone in engineering ingenuity was indicated clearly in a number of papers —especially in that by George B. Parsons, Duramold Aircraft Corp., New York. He described the molding of plastic bonded plywood parts by the autoclave method and demonstrated how such parts and complete sections can be made to serve in place of those for which the formerly abundant metal alloys are not now readily available.

Coal Substitute for Oil

Another case in point was the paper by R. B. Engdahl and F. E. Graves, research engineers, Battelle Memorial Institute, Columbus, O., on pulverized coal as a substitute for gas and oil in the firing of forge furnaces. On the basis of practical experiments which the authors have conducted for Bituminous Coal Research Inc., it appears that pulverized coal gives results almost identical to oil or gas when furnaces are properly fitted up for it. Among their exhibits were photomicrographs of specimens of SAE 1045 steel. One required 5 minutes in an oil-fired furnace, the other 8 minutes in the pulverized coal-fired furnace. The temperature of both samples, when removed from the furnace, was 2200 degrees Fahr. Conditions of surface decarburization, as revealed by picric acid etch and 100 times magnification, were practically identical.

Another important paper involving metal treating technique was that on practical applications of flame hardening by A. L. Hartley, metallurgist, R. K. Le Blond Machine Tool Co., Cincinnati. This dealt not only with the method as applied to ways on machine tool beds, but likewise to spot hardening, spin hardening and spiral hardening of smaller elements such as collars, shafts and gears.

A high point of the meeting was set by the stirring dinner address on Tuesday evening by Sir Louis Beale, co-ordinator of Empire and Allied Requirements, British Supply Council in North America. This

Candid "Snaps" at Mechanical Engineers' Luncheon

Left to right: A. T. Colwell, Thompson Products Inc.; Warner Seely, Warner & Swasey Co.; E. H. Whitlock, Whitlock Mfg. Co.; E. G. Bailey, Bailey Meter Co.

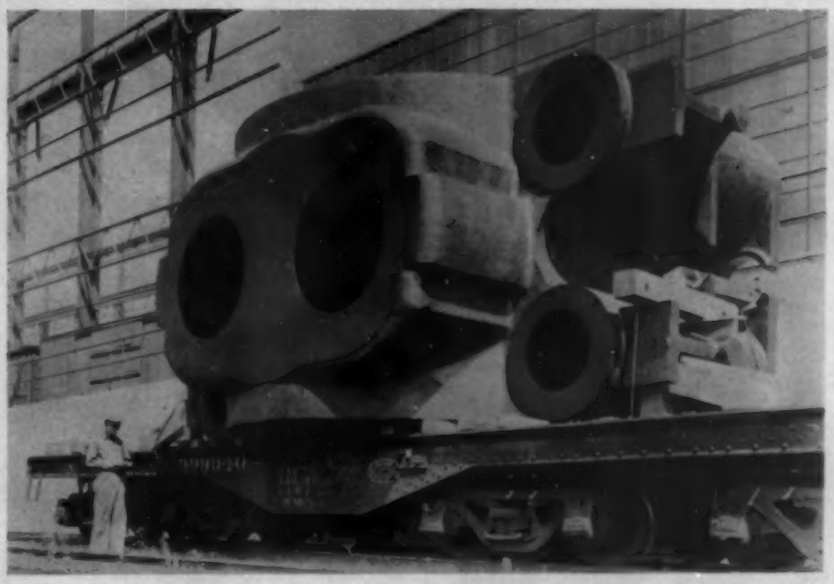
Left to right: E. G. Bailey, Bailey Meter Co.; James H. Herron, Herron Testing Laboratories Co.; William B. Stout, Stout Engineering Laboratories; E. L. Lindseth, Cleveland Electric Illuminating Co.; Roy V. Wright, editor, Railway Age; L. W. Wallace, Trundle Engineering Co.; K. M. Irwin, Philadelphia Electric Co.; G. Christie, Johns Hopkins University

speaker, now stationed in Washington, said: "The United Nations have won the battle of production, are winning the battle of transportation and will win the military combat." Speaking of conditions in Great Britain, he disclosed that British factories are now turning out twice as many tanks as were being produced last August and five times as many as were being produced at the same time in 1940.

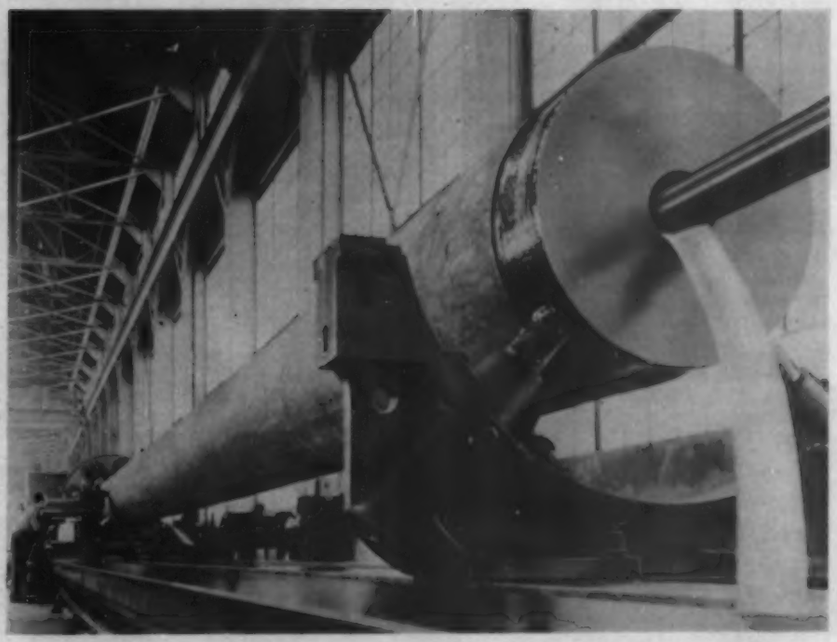
As an example of all-out production in England, he mentioned what is going on in his home city of Tunbridge Wells, a formerly non-industrial community of 36,000 not far from London. Under the leadership of a leading automobile dealer in the city whose establishment acts as a central clearing house of technical information and orders and a collection and assembly depot, every garage and back yard machine shop in Tunbridge Wells has been drawn into the manufacture of "bits and pieces" of war materiel. As a result, a volume of parts which otherwise would demand a specialized plant of great size, is pouring out of this typically English "home town."

In closing Sir Louis Beale said: "And now, at last, we see Americans fighting with equipment equal to that of the enemy—with courage, skill and brainwork which makes the final result certain."

Cap and Column for Armor Plate Forging Presses



THESE photographs taken recently in Mesta Machine Co.'s shops, Pittsburgh, indicate the enormous size of parts used in constructing modern armor-plate steel forging presses. It is not permissible to give details, but comparisons with other objects, such as the workmen, afford some idea of dimensions



A MELT of 600,000 pounds of steel was poured simultaneously from four ladles to produce the casting, above—one of the largest ever made. It will be the top cap for a 12,000-ton press

FINISHING a column for 14,000-ton press. To produce units such as this ingots weighing about 440,000 pounds each were poured in Mesta's open-hearth department, and forged in its own shops

Canadian Steel Capacity Raised 50% Since 1939

TORONTO, ONT.

SUBSTANTIAL enlargements have been made in primary steel-making facilities in Canada, and large extensions are under way. When the Dominion entered the war in September, 1939, capacity for making steel ingots and castings was slightly less than 2,100,000 tons annually. At the end of 1941 it had been increased to 3,164,000 tons, and 74,000 tons have been added this year. More will be added in the next three months as new electric furnaces will come into production. Current output is at 99 per cent of capacity.

At the beginning of 1942 Canada's capacity for ingots alone was 2,964,000 tons annually, of which 2,647,000 was basic open hearth and 317,000 tons electric. By the end of April the total had been raised to 3,023,000 tons, basic open hearth raised 20,000 tons, electric steel up 39,000 tons. Steel castings capacity has been increased 15,000 tons since the first of the year, to 215,000 tons. At the end of April total ingot and castings capacity was 3,238,000 tons.

As a result of blowing in a new blast furnace by Canadian Furnace Co., Port Colborne, Ont., increasing the company's pig iron production from 350 to 650 tons per day, Canada now has 12 blast furnaces with total rated capacity of 2,123,320 net tons, compared with 1,250,875 tons

at the outbreak of the war. Last year Steel Co. of Canada Ltd. built a new stack which has been producing about 850 tons per day. Further pig iron production is under way with building of a new stack at Sault Ste. Marie, Ont., and moving of the old United States Steel Corp. stack from Ojibway, Ont., to the Sydney, N. S., works of Dominion Steel & Coal Corp.

Addressing the Canadian Manufacturers' Association convention last week, Dr. J. F. Petrie, director of the recently formed Displaced Industries Division of the Department of Munitions and Supplies, stated that while his organization will seek conversion of non-war industries to war production, those not able to make the change will be out of luck as no subsidy can be granted unless war material can be produced.

April production of steel, pig iron and ferroalloys was slightly lower than that of March, due to the shorter month. Compared with April, 1941, the figures were considerably higher. Four months production was well above the corresponding period last year. Comparisons follow:

	Steel ingots, castings	Pig iron	Ferro-alloys
April, 1942....	264,988	160,408	18,128
March, 1942...	265,903	167,116	20,261
April, 1941....	224,761	115,727	18,100
4 mos., 1942...	1,032,828	634,653	73,751
4 mos., 1941...	845,780	447,567	65,032

Steel Production Approaches Record

May steel production exceeded that of April and was within a fraction of the peak total produced in March of this year.

According to the American Iron and Steel Institute, a total of 7,386,890 tons of steel ingots and castings was produced in May, compared with 7,122,313 tons in April and 7,392,911 tons in March.

Output last month was 5 per cent higher than in May a year ago, when 7,044,565 tons were produced.

The industry operated at an average of 98.2 per cent of capacity in May, against 97.7 per cent in April. In May, 1941, when capacity was substantially less than at present, operations averaged 98.5 per cent.

An average of 1,667,470 tons of steel ingots and castings was produced per week during May, compared with 1,660,213 tons in April and 1,590,195 tons in May of last year.

Alloy Steels 9.9 Per Cent of Total in 1941

Almost one out of every 10 tons of steel produced in the United States in 1941 was an alloy, by far the highest proportion of alloy steel ever recorded, according to the American Iron and Steel Institute.

Alloy steel ingots and castings for the year totaled nearly 8,175,000 tons, almost 65 per cent more than the best previous year's output, 4,966,000 tons in 1940, and 85 per cent more than was made in 1929, the best peacetime year. Alloy steels represented 9.9 per cent of total steel in 1941; 7.4 per cent in 1940, and 7 per cent in 1929.

Thus far in 1942 alloy production is in greater proportion than in 1941. Preliminary figures indicate that under current demand for the fine steels for war materials, production of high grade alloys is at the rate of more than 9,000,000 tons for the year, which would be more than twice as much as was required for the largest peacetime demand.

May Plate Shipments Exceed Million Tons

Steel plate shipments in May exceeded 1,000,000 tons, surpassing by more than 100,000 tons the record made in April, the WPB Iron and Steel Branch announced.

May shipments totaled 1,012,194 tons, of which 425,211 tons were made on continuous strip mills. This compares with 895,971 tons shipped in April, including 337,519 tons from strip mills.

Deliveries to shipyards for Maritime Commission orders topped 300,000 tons.

Further conversion of continuous strip mills to plate production now is under way and further increases in plate output are expected in subsequent months.

Shipments by types of mills for the past eight months follow:

	OCT. 1941	NOV. 1941	DEC. 1941	JAN. 1942	FEB. 1942	MAR. 1942	APRIL 1942	MAY 1942
Universal	94,311	99,828	113,467	122,227	111,965	123,152	121,838	125,608
Strip	152,440	169,311	182,604	250,396	268,988	306,195	337,519	425,211
Sheared	346,401	350,868	358,273	381,899	377,770	449,379	436,614	461,375
TOTAL	593,152	620,007	654,344	754,522	758,723	878,726	895,971	1,012,194
	(Percentages of totals)							
Universal	15.9	16.1	17.3	16.2	14.8	14.1	13.6	12.4
Strip	25.7	27.3	27.9	33.2	35.4	34.8	37.7	42.0
Sheared	58.4	56.6	54.8	50.6	49.8	51.1	48.7	45.6

STEEL INGOT STATISTICS

	Estimated Production—All Companies								Calculated weekly produc-tion, all companies Net tons	Number of weeks in month
	Open Hearth		Bessemer		Electric		Total			
	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity		
Based on Reports by Companies which in 1940 made 98.43% of the Open Hearth, 100% of the Bessemer and 85.82% of the Electric Ingot and Steel for Castings Production										
1942										
Jan. ..	6,328,128	95.4	490,864	86.0	305,930	96.3	7,124,922	94.7	1,608,335	4.43
Feb. ..	5,791,813	96.7	453,543	88.0	275,700	96.2	6,521,056	96.0	1,630,264	4.00
Mar. ..	6,574,701	99.1	493,294	86.4	324,916	102.3	7,392,911	98.2	1,668,829	4.43
1st quar	18,694,642	97.0	1,437,701	86.7	906,546	98.3	21,038,889	96.3	1,635,994	12.86
April .	6,346,707	98.8	454,583	82.2	321,023	104.4	7,122,313	97.7	1,660,213	4.29
May ..	6,600,376	99.5	454,054	79.5	332,460	104.7	7,386,890	98.2	1,667,470	4.43
Based on Reports by Companies which in 1940 made 98.43% of the Open Hearth, 100% of the Bessemer and 85.82% of the Electric Ingot and Steel for Castings Production										
1941										
Jan. ..	6,274,780	99.0	451,806	76.0	195,766	89.1	6,922,352	96.8	1,562,608	4.43
Feb. ..	5,669,425	99.1	378,536	70.5	182,393	91.9	6,230,354	96.5	1,557,589	4.00
Mar. ..	6,457,641	101.9	460,225	77.4	206,137	93.8	7,124,003	99.6	1,608,127	4.43
1st quar	18,401,846	100.1	1,290,567	74.8	584,296	91.6	20,276,709	97.7	1,576,727	12.86
April..	6,137,613	100.0	395,056	68.6	221,510	104.1	6,754,179	97.6	1,574,401	4.29
May ..	6,362,245	100.4	444,079	74.7	238,241	108.4	7,044,565	98.5	1,590,195	4.43
June .	6,098,171	99.4	458,848	79.7	235,732	110.8	6,792,751	98.1	1,583,392	4.29
2nd qtr	18,598,029	100.0	1,297,983	74.3	695,483	107.8	20,591,495	98.1	1,582,744	13.01
1st half	36,999,875	100.0	2,588,550	74.6	1,279,779	99.7	40,868,204	97.9	1,579,753	25.87
July ..	6,085,100	94.4	489,297	85.0	237,827	85.7	6,812,224	93.3	1,541,227	4.42
Aug...	6,244,353	96.6	495,761	85.9	257,382	92.6	6,997,496	95.6	1,579,570	4.43
Sept...	6,054,418	96.9	500,768	89.8	256,568	95.5	6,811,754	96.3	1,591,531	4.28
3rd qtr	18,383,871	96.0	1,485,826	86.9	751,777	91.2	20,621,474	95.1	1,570,562	13.13
9 mos.	55,383,746	98.6	4,074,376	78.6	2,031,556	96.4	61,489,678	96.9	1,576,658	39.00
Oct. ..	6,423,329	99.4	533,060	92.4	279,679	100.6	7,236,068	98.9	1,633,424	4.43
Nov...	6,194,679	99.0	488,822	87.5	277,384	103.0	6,960,885	98.2	1,622,584	4.29
Dec. ..	6,387,865	99.0	481,813	83.7	280,637	101.2	7,150,315	97.9	1,617,718	4.42
4th qtr	19,005,873	99.1	1,503,695	87.8	837,700	101.6	21,347,268	98.3	1,624,602	13.14
Total .	74,389,619	98.8	5,578,071	80.9	2,869,256	97.9	82,836,946	97.3	1,588,741	52.14

The percentages of capacity operated in the first six months of 1941 are calculated on weekly capacities of 1,430,102 net tons open hearth, 134,187 net tons bessemer and 49,603 net tons electric ingots and steel for castings, total 1,613,892 net tons; based on annual capacities as of Dec. 31, 1940 as follows: Open hearth 74,565,510 net tons, bessemer 6,996,520 net tons, electric 2,586,320 net tons. Beginning July 1, 1941, the percentages of capacity operated are calculated on weekly capacities of 1,459,132 net tons open hearth, 130,292 net tons bessemer and 62,761 net tons electric ingots and steel for castings, total 1,652,185 net tons; based on annual capacities as of June 30, 1941 as follows: Open hearth, 76,079,130 net tons, bessemer 6,793,400 net tons, electric 3,272,370 net tons.

The percentages of capacity operated in 1942 are calculated on weekly capacities of 1,498,029 net tons open hearth, 128,911 net tons Bessemer and 71,682 net tons electric ingots and steel for castings, total 1,698,622 net tons; based on annual capacities as of Jan. 1, 1942 as follows: Open hearth 78,107,280 net tons, Bessemer 6,721,400 net tons, electric 3,737,510 net tons.

Index Resumes Uptrend; War Contracts at Flood

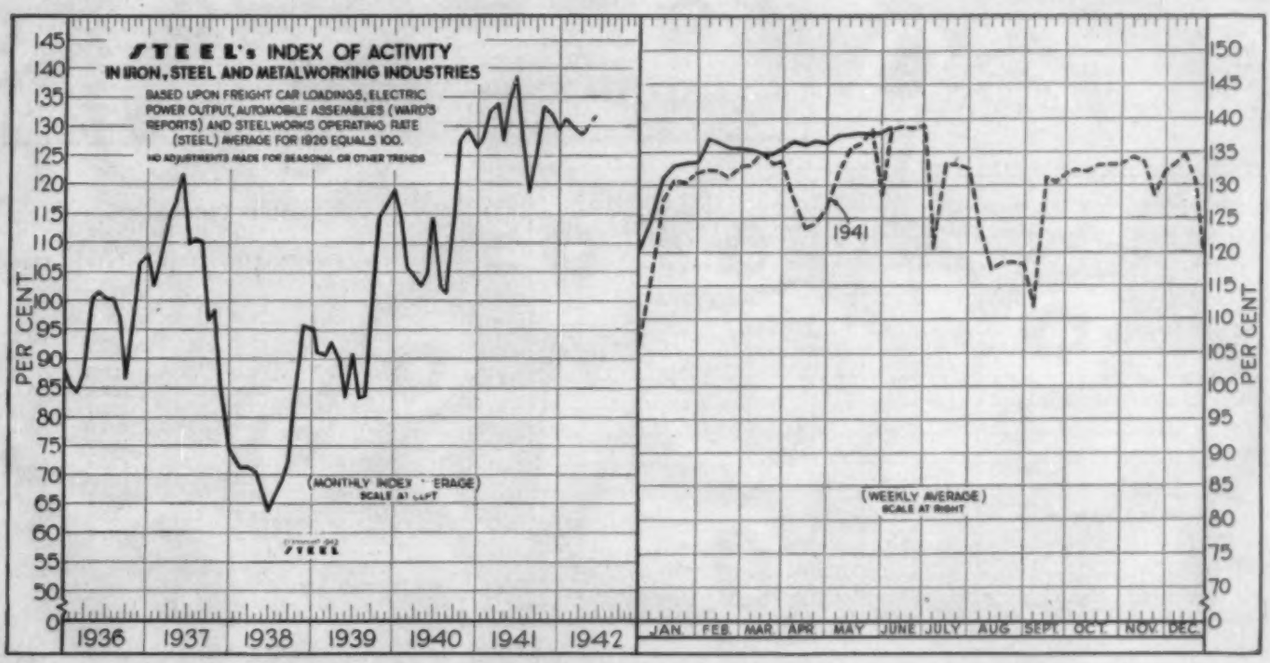
PRESSURE of capacity operation and continual flow of contracts into plants turning out equipment for the armed services are forcing wider distribution of subcontracts. Extension of the negotiated-contract policy by prime contractors is expected to bring into the picture some of the estimated 24,000 small plants which have been brushed aside in the headlong rush to meet production goals.

Success of structural steel shops in getting subcontracts for ship fabrication contributed in part to the record total of April structural steel bookings, 327,420, largest of any month since 1929 and 79,101 tons greater than March, 1942.

Pacing other lines in the generally upward course of business through the week ended June 6, freight car loadings increased 58,933 cars for a total of 854,689. Gain was shown despite continued backing up of lend-lease freight on factory docks. Electric power output rose to 3,372,374 kilowatts.

With steel production moving steadily on the 99 per cent level, STEEL's Index of Activity took up the month-end slack, swinging up to 138.4.

Total ingot production for May was 7,386,890 tons, barely short of the March top. Finished steel shipments for the month amounted to 1,834,127 tons, a 9 per cent increase over April. Employment in the industry was again expanded in April, climbing to 654,000. Previous high point was touched last August when the steel industry reported an identical total.

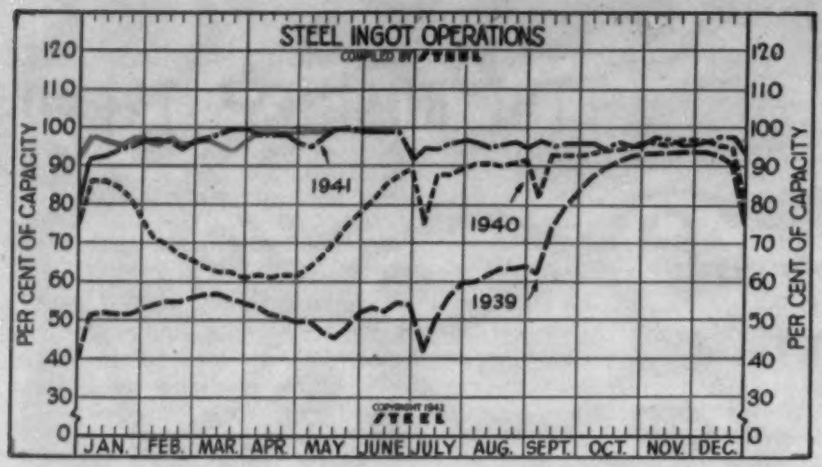

STEEL's INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL) AVERAGE FOR 1920 EQUALS 100.
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
1941
(MONTHLY INDEX AVERAGE)
SCALE AT LEFT
(WEEKLY AVERAGE)
SCALE AT RIGHT
1936 1937 1938 1939 1940 1941 1942
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

STEEL's index of activity advanced 2.4 points to 138.4 in the week ending June 6:

Week Ended	1942	1941
April 4	136.7	128.9
April 11	136.1	123.8
April 18	136.6	124.2
April 25	136.3	126.5
May 2	137.2	132.6
May 9	137.5	135.9
May 16	137.9	136.1
May 23	138.1†	138.6
May 30	136.0	128.4
June 6	138.4	138.4

†Revised.

Mo. Data	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Jan.	131.3	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1
Feb.	129.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5
March	128.6	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4
April	129.5	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0
May	132.4	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6
June	.....	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1
July	.....	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3
Aug.	.....	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4
Sept.	.....	126.4	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3
Oct.	.....	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2
Nov.	.....	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4
Dec.	.....	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3



Steel Ingot Operations

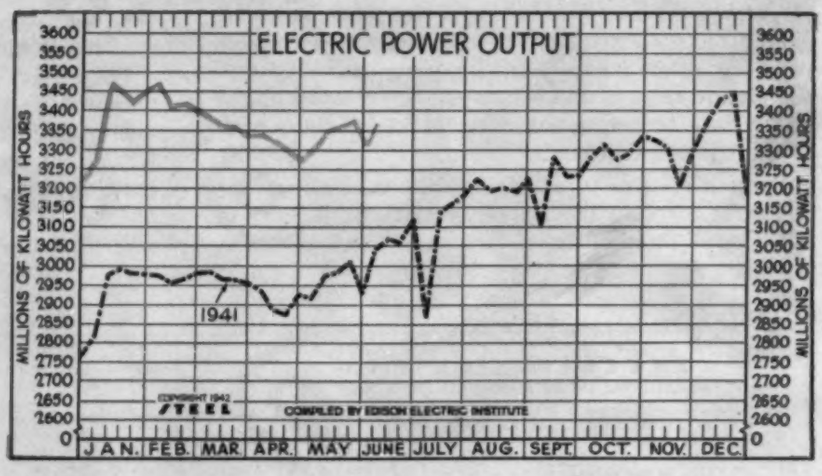
(Per Cent)

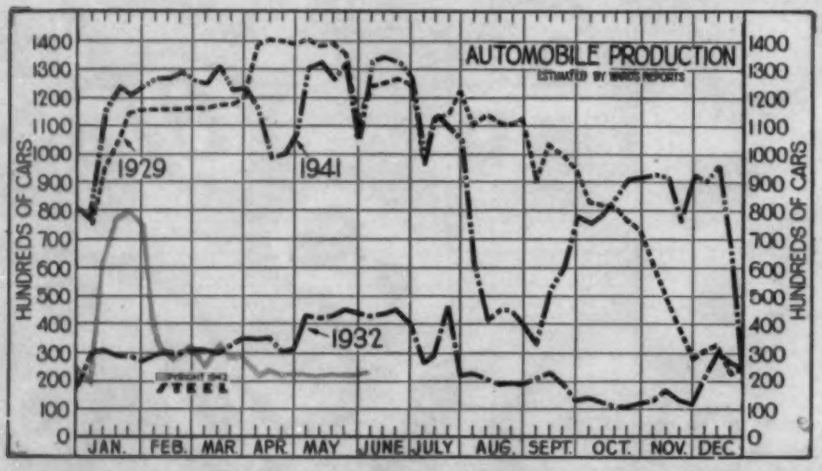
Week ended	1942	1941	1940	1939
June 6....	99.0	99.0	81.5	53.5
May 30....	99.0	99.0	78.5	52.0
May 23....	99.0	100.0	75.0	48.0
May 16....	99.5	99.5	70.0	45.5
May 9....	99.0	97.5	66.5	47.0
May 2 ...	99.0	95.0	63.5	49.0
April 25...	98.5	96.0	61.5	49.0
April 18...	98.5	98.0	61.5	50.5
April 11...	98.5	98.0	61.0	51.5
April 4....	98.0	98.0	61.5	53.5
Mar. 28....	97.5	99.5	61.0	54.5
Mar. 21....	95.5	99.5	62.5	55.5
Mar. 14....	95.5	98.5	62.5	56.5
Mar. 7.....	96.5	97.5	63.5	56.5
Feb. 28....	96.0	96.5	65.5	56.0
Feb. 21....	96.0	94.5	67.0	55.0

Electric Power Output

(Million KWH)

Week ended	1942	1941	1940	1939
June 6.....	3,372	3,076	2,453	2,257
May 30.....	3,323	2,730	2,332	2,204
May 23.....	3,380	3,012	2,589	2,778
May 16.....	3,357	2,983	2,550	2,235
May 9.....	3,351	2,975	2,516	2,239
May 2.....	3,305	2,915	2,504	2,225
April 25.....	3,299	2,926	2,499	2,244
April 18.....	3,308	2,874	2,529	2,265
April 11.....	3,321	2,882	2,530	2,235
April 4	3,349	2,938	2,494	2,244
Mar. 28.....	3,346	2,956	2,524	2,272
Mar. 21.....	3,357	2,964	2,508	2,258
Mar. 14.....	3,357	2,965	2,550	2,276
Mar. 7.....	3,392	2,987	2,553	2,285
Feb. 28.....	3,410	2,982	2,568	2,294
Feb. 21.....	3,424	2,968	2,547	2,269


ELECTRIC POWER OUTPUT
MILLIONS OF KILOWATT HOURS
1941
COMPILED BY EDISON ELECTRIC INSTITUTE
J A N. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.



Auto Production

(1000 Units)

Week ended	1942	1941	1940	1939
June 6....	22.0	133.6	95.6	65.3
May 30....	21.5	106.4	61.3	32.4
May 23....	21.6	133.6	96.8	67.7
May 16....	21.8	127.3	99.0	80.1
May 9....	21.5	132.6	98.5	72.4
May 2....	22.0	130.6	99.3	71.4
April 25...	21.9	108.2	101.4	86.6
April 18...	21.7	99.9	103.7	90.3
April 11...	23.0	99.3	101.9	88.1
April 4....	22.3	116.3	101.7	87.0
Mar. 28....	28.9	124.2	103.4	86.0
Mar. 21....	28.9	123.8	103.4	89.4
Mar. 14....	30.6	131.6	105.7	86.7
Mar. 7.....	24.5	125.9	103.6	84.1
Feb. 28....	30.1	126.6	100.9	78.7

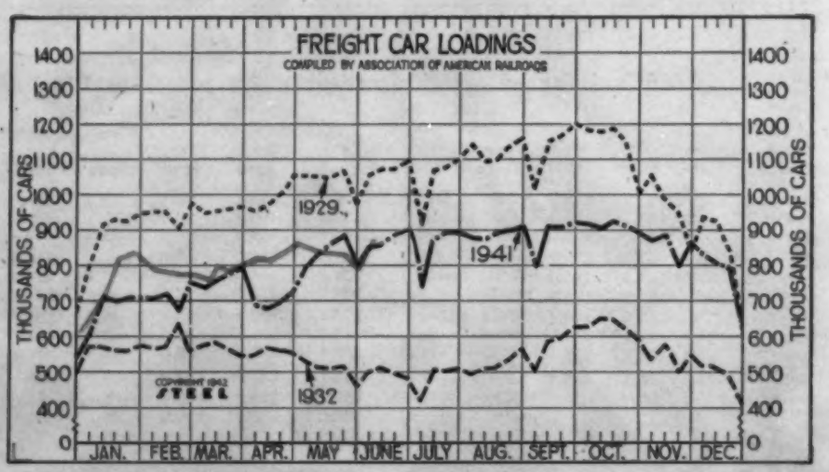
†Canadian trucks and automobiles and United States trucks, since Feb. 21.

Freight Car Loadings

(1000 Cars)

Week ended	1942	1941	1940	1939
June 6.....	855	853	703	635
May 30.....	796	802	639	568
May 23.....	838†	866	687	628
May 16.....	839	861	679	616
May 9.....	839	837	681	555
May 2.....	859	794	666	573
April 25.....	855	722	645	586
April 18.....	847	709	628	559
April 11.....	814	680	619	548
April 4.....	829	683	603	535
Mar. 28.....	805	792	628	604
Mar. 21.....	797	769	620	605
Mar. 14.....	799	759	619	595
Mar. 7.....	771	742	621	592

†Revised.

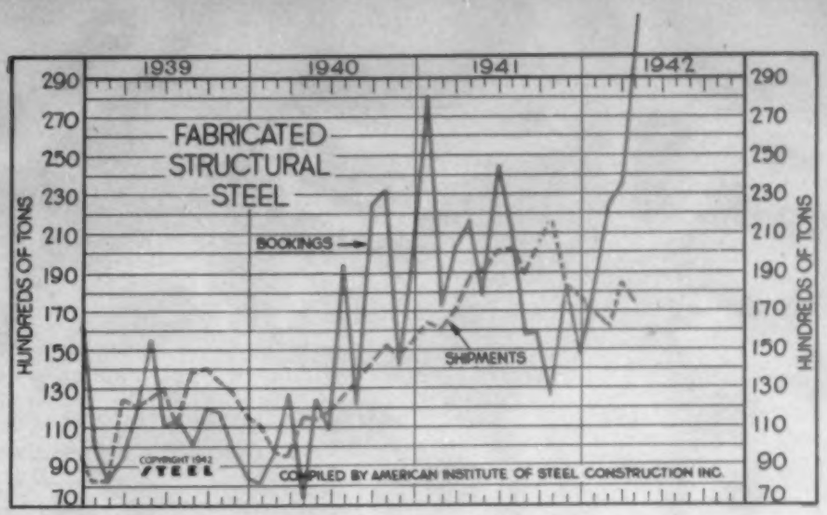


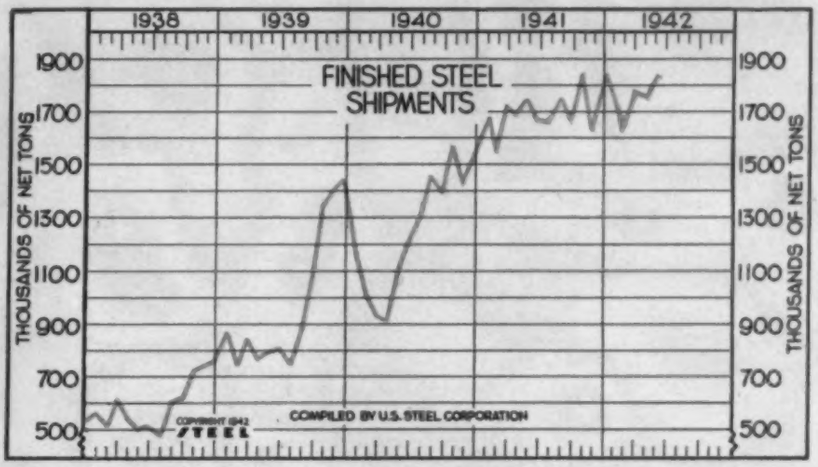
Fabricated Structural Steel

(1000 tons)

	Shipments			Bookings		
	1942	1941	1940	1942	1941	1940
Jan.	166.2	164.6	110.9	181.8	281.2	81.7
Feb.	162.0	161.4	97.2	227.0	173.6	98.9
Mar.	191.3†	170.2	95.9	248.3†	206.1	128.3
Apr.	176.9	189.8	116.3	327.4	218.0	73.8
May	....	191.9	115.6	....	179.9	126.8
June	....	200.5	119.1	....	246.9	109.7
July	....	203.0	127.1	....	214.8	194.9
Aug.	....	189.3	134.9	....	158.7	122.5
Sept.	....	204.1	142.8	....	158.8	225.5
Oct.	....	217.7	153.2	....	128.7	233.1
Nov.	....	182.6	147.0	....	184.0	141.9
Dec.	....	176.1	155.5	....	146.4	203.1
Tot.	....	2251.1	1515.5	....	2297.0	1748.1

†Revised.





Finished Steel Shipments
U. S. Steel Corp.

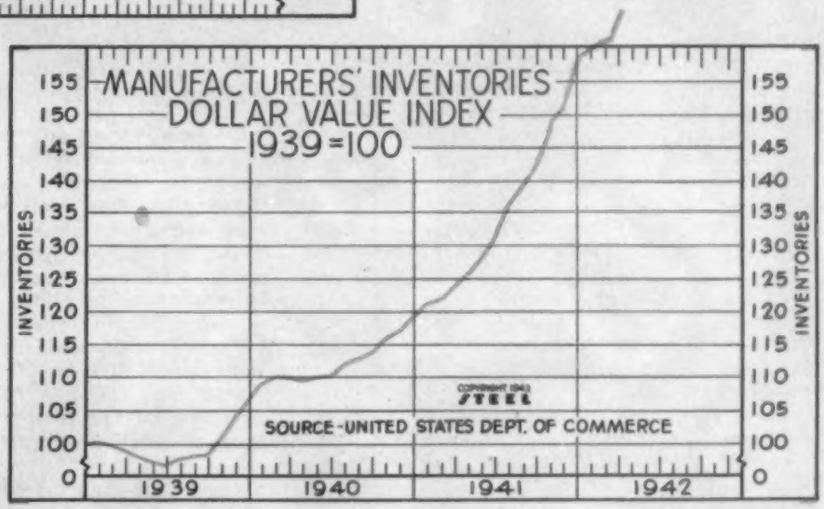
(Unit 1000 Net Tons)

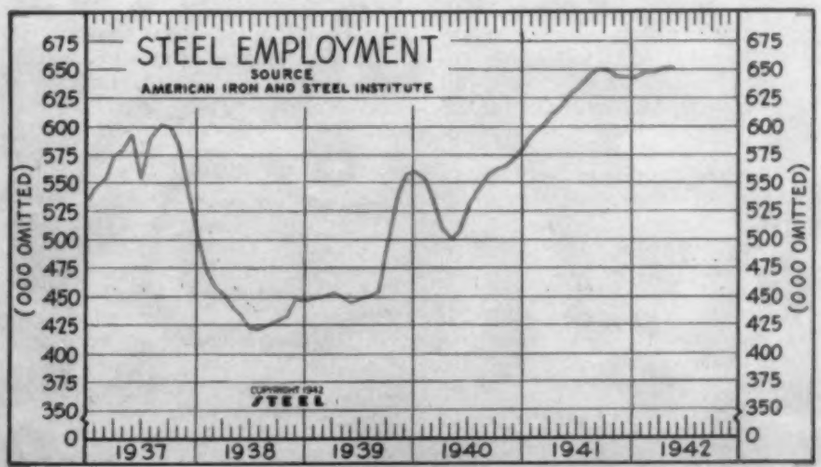
	1942	1941	1940	1939	1938
Jan...	1738.9	1682.5	1145.6	870.9	570.3
Feb...	1616.6	1548.5	1009.3	747.4	522.4
Mar...	1780.9	1720.4	931.9	845.1	627.0
Apr...	1758.9	1687.7	907.9	771.8	550.5
May..	1834.1	1745.3	1084.1	795.7	509.8
June .	.....	1668.6	1209.7	807.6	525.0
July..	.....	1666.7	1296.9	745.4	484.6
Aug..	.....	1753.7	1455.6	885.6	615.5
Sept..	.....	1664.2	1392.8	1086.7	635.6
Oct...	.....	1851.3	1572.4	1345.9	730.3
Nov..	.....	1624.2	1425.4	1406.2	749.3
Dec...	.....	1846.0	1544.6	1444.0	765.9
Tot.†	.....	.....	15,013.7	11707.3	7315.5

†After year-end adjustments.

Manufacturers' Inventories
Dollar Value Index
1939 = 100

	1942	1941	1940	1939
Jan.	161.9	121.8	109.5	100.9
Feb.	163.1	122.7	110.6	100.4
March	166.1	124.1	110.5	99.5
April	.....	126.0	110.0	98.5
May	.....	128.7	110.5	97.9
June	.....	132.0	110.6	97.4
July	.....	136.4	112.2	98.1
Aug.	.....	140.0	113.3	98.8
Sept.	.....	143.4	114.1	98.9
Oct.	.....	148.3	116.2	101.3
Nov.	.....	152.7	117.7	104.5
Dec.	.....	158.5	119.9	107.2
Mo. Ave.	.....	136.2	113.0	109.3





Steel Employment

(000 omitted)

	1942	1941	1940	1939	1938
Jan.	651	598	556	451	475
Feb.	651	603	538	453	461
Mar.	653	613	514	455	455
Apr.	654	621	503	452	445
May	...	632	510	448	436
June	...	638	535	451	425
July	...	648	549	453	424
Aug.	...	654	560	458	427
Sept.	...	652	565	502	431
Oct.	...	646	568	545	436
Nov.	...	645	577	561	450
Dec.	...	646	585	563	449

RESISTANCE HEATING

FOR FORGING

How metals may be heated from within or from without; thermodynamic considerations; metallurgical aspects; conversion of electric energy into heat; automatic control with the electric eye; range of application

(Section X in a Series on Forgings, Forging Methods and Forging Equipment)

By **ARTHUR F. MACCONOCHIE**
Head, Department of Mechanical Engineering
University of Virginia
University Station, Va.
And
Contributing Editor, STEEL

CONSIDER the various means by which heat may be caused to enter metal and note that these fall into two broad classifications—namely, those in which heat flows from one body to another at a lower temperature as a result of radiation, conduction or convection, and those in which the heat is generated within the metal itself. To the first group belong the familiar types of gas, oil, or electric furnaces and to the latter the electric induction coil and resistance heater.

In considering which particular method to adopt, there is on the one hand the primary problem of economy and on the other the metallurgical question of suitability. These two considerations are not sharply differentiated since the condition in which the metal leaves the heating operation may have an important bearing on the life of the tools employed in the foregoing operation. Further, the accuracy with which temperatures may be held within prescribed limits may affect production rates and percentage losses of material. Thus a number of factors affect the final decision, all of which, however, are more or less susceptible of accurate evaluation.

If, for example, we direct our attention to the matter of energy cost, we have to recognize that heat generated directly from fuel such as gas or oil is cheaper than the high-grade electric energy supplied by the power plant. In developing electric power from heat at a power plant, a large percentage of energy is unavoidably lost as a direct consequence of the low thermal efficiency of any power plant. Further, we have to recognize that a large capital investment is necessary before heat may be transformed into mechanical work.

In the fuel-fired furnace which acts as a primary converter of the chemical potential energy of the fuel into heat, thermodynamic losses of a high order must of necessity occur since, however efficient the process of combustion, the temperature drop between the source of the heat and the work is not large and hence a high percentage of the heat generated is lost in the waste gases. Not only is this true, but in order to provide a radiant shell within which the process of heat transfer may take place, a large mass of refractory must be heated to a high temperature and so heat is dissipated by leakage. Hence, in the final analysis, energy costs for the two different methods may not be far apart.

Now as to the metallurgical aspects, our aim ideally would be to heat the blank in the shortest possible space of time and with the highest degree of uniformity throughout the operation. The reasons for this are not far to seek. In the case especially of steel, prolonged exposure to the atmosphere of the ordinary furnace tends toward the formation of a heavy scale and an increase in the size of the crystalline grains. Decarburization also may occur. Therefore, unless there is a detrimental effect upon forging characteristics, the more rapid and uniform the application of heat, the lighter the scale and the less the chance of cracking of the steel as a consequence of uneven thermal expansion.

In the furnace, heat enters from the outside and proceeds by the relatively slow process of conduction toward the core—an action which cannot be accelerated beyond a practical limit imposed by working temperature limits of the refractories. The use of electric current in the resistance heater avoids these limitations and brings the practical application very close to our ideal specifications.

The generation of heat by a current of electricity flowing in a conductor is a phenomenon familiar to all. The temperature will rise until the rate of energy transformation balances the losses from radiation, conduction, etc. The relations which exist between the various factors which determine the final temperature of a piece of resistance heated steel, the time required and the power consumption are somewhat involved, partly as a result of the variation in the electrical resistance of the metal itself. As far as pure metals are concerned, this varies as a linear function of the temperature for moderate temperature increases and changes in accordance with both linear and quadratic functions of the temperature as the temperature rises.

In practice, an electric current of relatively low voltage and large amperage is used in order that the heating effect may be as large as possible. In general, for any given material at constant voltage, the lower the electrical resistance, the higher the resulting temperature. Further, as the cross section of the piece diminishes and its length increases, the resistance increases. The time required and also the power consumption for a given temperature rise are directly influenced by the specific heat and the mass of the piece being heated; and also by the rate of heat loss.

In brief, it requires from 18 to 20 kilowatt-hours of electric energy to raise 100 pounds of metal to a temperature of 2000 degrees Fahr. —a lower temperature, of course, lowering this figure and a higher temperature increasing it. If the mean specific heat of iron between 32 to 2000 degrees Fahr. be taken as 0.168, a simple calculation will show that the efficiency of conversion is just under 50 per cent. This compares with thermal efficiencies of only a few per cent for some fuel-fired furnaces.

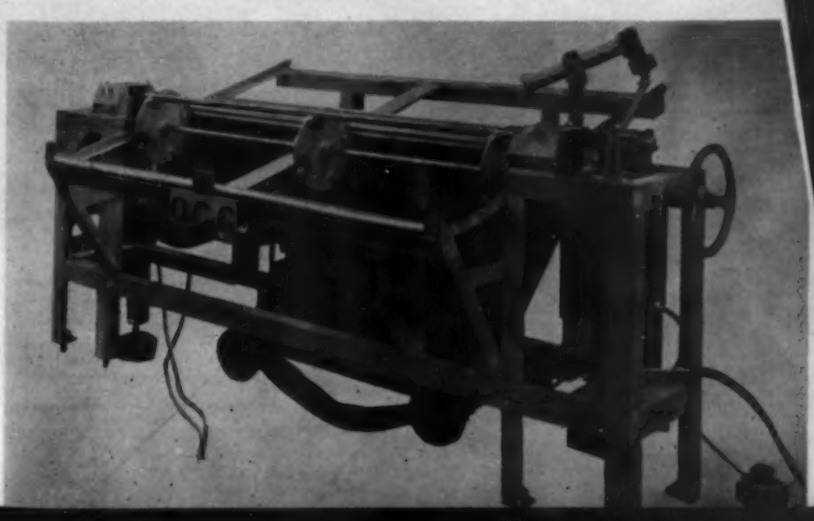
Not the least among the advan-

(Please turn to Page 72)

Fig. 1. (Above)—Here is a fully automatic unit heating bar blanks for forging into drag link sockets. Note that it is a dual machine with two sets of controls, two piles of bar blanks, two delivery chutes to operator's pickup station. Forging machine is just to right

Fig. 2. (Right)—Modern design of multiple rivet heater of the electric resistance type. It heats a rivet in 10 seconds. All photos show heating equipment made by American Car & Foundry Co., Berwick, Pa. Note lever heat control, foot-operated electrode movement

Fig. 3. (Below)—This is an air-operated 6-foot bar heater which employs electric energy to heat the work by its own resistance. Thus all heat is developed in the work. Final temperature is controlled automatically by electric eye which shuts off current



Properties of . . . .

The NEW NE (National Emergency) ALLOY STEELS

(Section II)

A PORTION of the 58 charts that have been prepared to show the properties of the new NE steels appeared in STEEL, June 8, 1942, p. 66 through 69. The remainder of these charts are presented in the accompanying material. As soon as others are prepared, they also will be published in STEEL so the information they contain will be made available to the widest possible number of engineers and metallurgists.

These and other technical men now find it necessary to adapt their designs and processing specifications to utilize these alloys instead of the high alloys which are no longer available due to the huge demands made on our supply of essential alloys by the war production program. Thus a wide distribution of this essential information is of the utmost importance and is particularly timely at the present moment.

Certain steels have their test data available in tabulated instead of chart form. This information is given in the accompanying tables.

Supplementing Table III on NE 8442, is this memorandum on the physical properties of an English steel similar to NE 8442 taken from tests conducted in England. The results should be considered only as a rough approximation of what might be expected from this analysis, and in no case should they be used for the purpose of arriving at minimum physical property requirements.

The normal expectancy physical properties of all of the NE 8000 series steels in the normalized and drawn, the oil quenched and drawn, and the water quenched and drawn conditions are at present being developed by the steel companies listed on sheet 2 of *War Production Board Bulletin No.* 27803. It is anticipated that these data will be available by July 1, 1942.

The English data follow: The steel analyzes 0.35 per cent carbon, 1.45 manganese, 0.33 molybdenum. Oil quenched from 1545 degrees Fahr., the center of a 4-inch square is reported as giving the following physical properties after being drawn at the temperature shown:

	1110° F.	1200° F.
Max. Strength, p.s.i.	126,140	117,380
Yield Point, p.s.i.	108,820	98,560
Elong. in 2 in., %	18.5	21.5
Red. of Area, %	49.6	57.2
Izod Impact, ft. lb.	71.0	75.0

Please read carefully the comments carried with the first set of these charts, STEEL, June 8, p. 66. These referred to certain exceptions and pointed out that certain charts were made from "estimated values" which would mean that the extremes of these curves (for NE 8739, 8630, 8620-8724, and 8744) would probably fall outside the straight lines shown in the charts.

"AMS" steels referred to in some of the charts are steels listed in the new Aircraft Materials Specifications.

This week's charts appear on pages 66, 67, 68, 70 and 72.

Table I—NE 8630—Physical Test Data—Single Heat Results

NE 8630—Heat No. 690148—shipped 3¼" Sq. Hammer forged to 1" Sq.—normalize 1700° F. Rough Machine to ⅞" Rds. Quench—oil from 1540° F.—BHN 440/460.

	C	Mn	S	P	Si	Ni	Cr	Mo
Heat No. 690148	.33	.79	.010	.013	.22	.45	.40	.15

Draw Temp.	Yield	Ultimate	R.A.	El. 2"	Izod	BHN
1000	127,000	142,000	54	17	51-52-47	340
1050	122,250	138,150	61	20	61-62-65	321
1100	118,000	133,900	63	20	75-71-72	302
1150	110,200	126,100	64.5	21.5	76-78-78	286
1200	98,900	115,400	65	23	84-90-85	269
1250	89,100	109,350	69	25.5	95-93-98	235
1300	83,450	104,400	70.5	27	91-90-99	223
Norm. 1700° 1" Sq. & Drawn 1200°—Drawn in ⅞" Rd.	78,600	99,300	62	25	45-49-46	212

Table II—NE 8749—Physical Test Data—Single Heat Results

NE 8749—Heat No. 690155—shipped 2¼" Sq. Hammer forged to 1" Sq.—normalize 1700° F. Rough machine to ⅞" Rd. Oil quench from 1500° F.

	C	Mn	S	P	Si	Ni	Cr	Mo
Heat No. 690155	.53	.86	.011	.014	.28	.43	.44	.15

Drawn	Yield	Ultimate	R.A.	El. 2"	Izod	BHN
1050	142,950	167,750	41	15	32-30-30	364
1100	133,600	160,700	47	17	36-34-35	340
1150	125,450	150,250	47	17.5	44-40-39	311
1200	103,900	135,350	56	20.5	52-54-50	286
1250	102,000	120,300	57.5	24	64-63-67	255
1300	92,350	112,550	57	24.5	62-61-57	241
Norm. 1700° 1" Sq. & Drawn 1200°—Drawn in ⅞" Rd.	82,400	116,700	50	21.5	.....	248

1100 to 1150° F. draw is similar to 4245—both physicals and hardness.

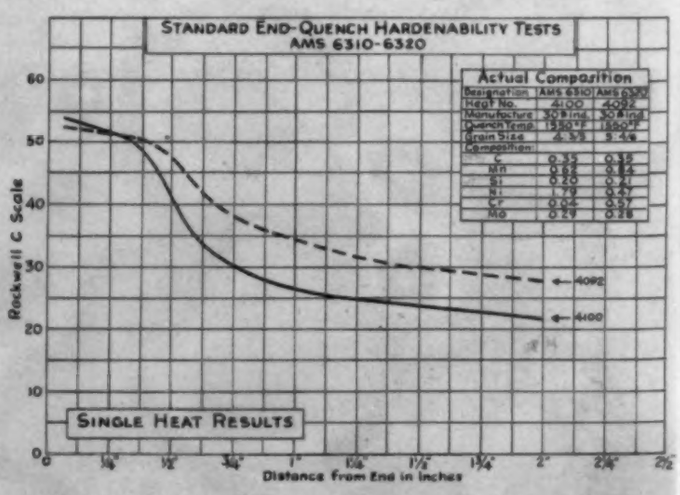
Table III—NE 8442—Physical Test Data—Single Heat Results

From a 4¼" square a 1¾" round was cut halfway between the center and the outside. This round was then oil quenched from 1550° F. and drawn with the following results:

	Drawn at 1075° F.	Drawn at 1125° F.
Tensile Strength, p.s.i.	156,000	144,000
Yield Point, p.s.i.	140,000	129,000
Elongation in 2" %	18	19.5
Reduction of Area, %	56	61.1
BHN	311	285-292

In addition a 4¼" section was oil quenched from 1500° F. and drawn for 5 hours at 1225° F. A tensile specimen cut halfway between the center and the outside gave the following physical properties:

Tensile Strength, p.s.i.	113,000
Elastic Limit, p.s.i.	88,000
Elongation in 2", %	21
Reduction of Area, %	63
BHN	241

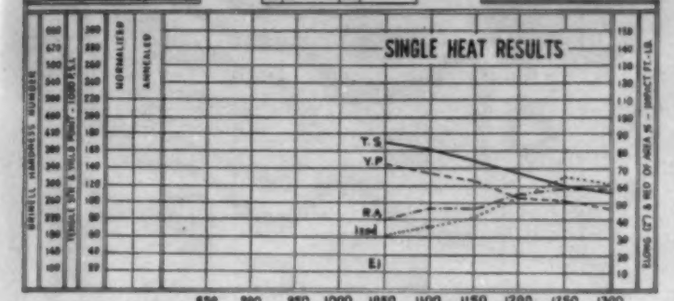


RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE	1700	AIR
ANNEAL		
QUENCH	1500	OIL
TEST PIECE TREATED IN 7/8" Round		

N. E. 8749
Ni-Cr-Mo Forged Steel

CRITICAL POINTS °F.			
Ac1		Ar1	
Ac3		Ar3	

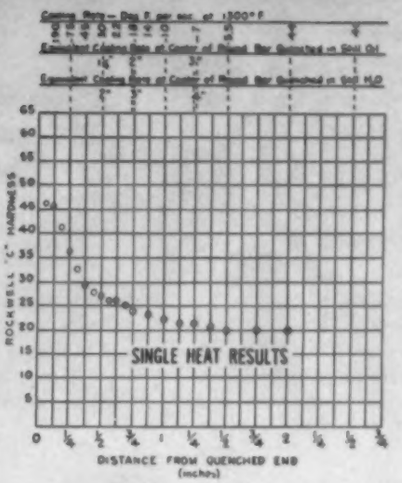
CHEMICAL SPECIFICATIONS			
C %	0.38	Ni %	0.43
Mn %	0.86	Cr %	0.44
P %	0.014		
S %	0.011		
Si %	0.28	Mo %	0.15



BRINELL 384 340 311 286 255 241

N 1700 - 1" Sq, T 1200 - 7/8" Rd. T.S. 118,700 Y.P. 82,400 R.A. 50 El. 21.5 BHN 248

Izod value is average of 3 breaks


Cooling Rate — Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Still H2O
SINGLE HEAT RESULTS
ROCKWELL "C" HARDNESS
DISTANCE FROM QUENCHED END (inches)

END-QUENCH HARDENABILITY TEST

N.E. 8620
N.E. 8724
(Type of Steel)

ANALYSIS			
C	0.23	Cr	0.50
Mn	0.90	Ni	0.51
Si	0.32	Mo	0.25
P			
S			

Grain Size 8-7
Quenching Temp 1550 °F

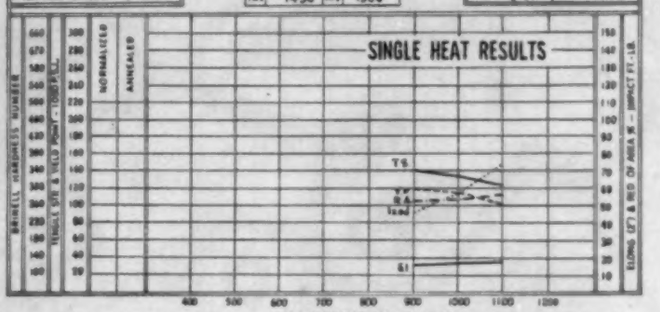
Remarks
Held 1700° F. 8hrs @ 1550
Electric steel.

RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE	1650	AIR
ANNEAL		
QUENCH	1525	OIL
TEST PIECE TREATED IN 4" ROUND		

N.E. 8739
Ni-Cr-Mo Wrought Steel
Grain Size 7-8

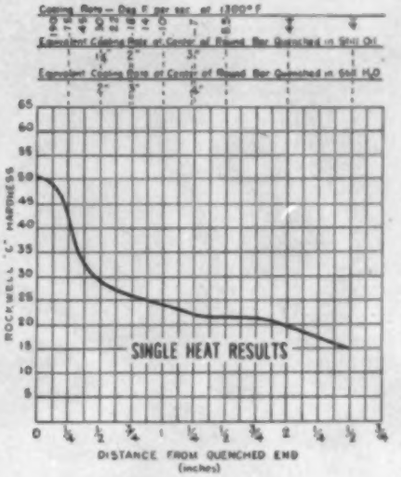
CRITICAL POINTS °F			
Ac1	1350	Ar1	1180
Ac3	1490	Ar3	1300

CHEMICAL SPECIFICATIONS			
C %	0.41	Ni %	0.46
Mn %	0.86	Cr %	0.47
P %	0.015		
S %	0.019		
Si %	0.31	Mo %	0.26



Tensile Brinell 311 302 286

Held 4 Hr at Draw Temp


Cooling Rate — Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Still H2O
SINGLE HEAT RESULTS
ROCKWELL "C" HARDNESS
DISTANCE FROM QUENCHED END (inches)

END-QUENCH HARDENABILITY TEST

N.E. 8630
(Type of Steel)

ANALYSIS			
C	0.306	Cr	0.49
Mn	0.80	Ni	0.42
Si	0.25	Mo	0.22
P	0.014		
S	0.015		

Grain Size 7-8
Quenching Temp 1550 °F

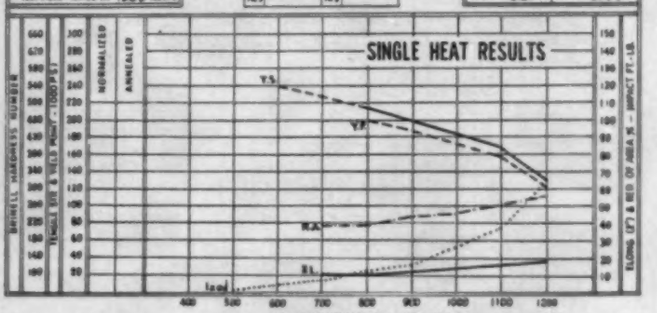
Remarks
Held 45 min at temp

RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE		AIR
ANNEAL		
QUENCH	1450	OIL
TEST PIECE TREATED IN 5.09" Round		

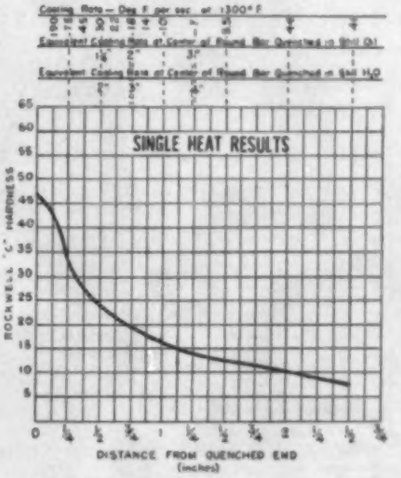
N.E. 8547
Mn-Mo Wrought Steel
Grain Size 6-8

CRITICAL POINTS °F			
Ac1		Ar1	
Ac3		Ar3	

CHEMICAL SPECIFICATIONS			
C %	0.90	Ni %	0.10
Mn %	1.48	Cr %	0.28
P %			
S %			
Si %	0.21	Mo %	0.44



BRINELL 930 810 495 455 447 410 385 290


Cooling Rate — Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Still H2O
SINGLE HEAT RESULTS
ROCKWELL "C" HARDNESS
DISTANCE FROM QUENCHED END (inches)

END-QUENCH HARDENABILITY TEST

N.E. 8620
(Type of Steel)

ANALYSIS			
C	0.19	Cr	
Mn	0.80	Ni	0.46
Si	0.23	Mo	0.22
P	0.016		
S	0.015		

Grain Size 7-8
Quenching Temp 1550 °F

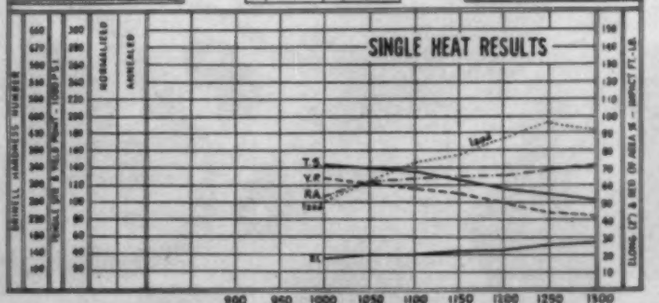
Remarks
Held 45 min at temp

RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE	1700	AIR
ANNEAL		
QUENCH	1540	OIL
TEST PIECE TREATED IN 7/8" Round		

N. E. 8630
Ni-Cr-Mo Forged Steel

CRITICAL POINTS °F			
Ac1		Ar1	
Ac3		Ar3	

CHEMICAL SPECIFICATIONS			
C %	0.33	Ni %	0.45
Mn %	0.79	Cr %	0.60
P %	0.013		
S %	0.010		
Si %	0.22	Mo %	0.15

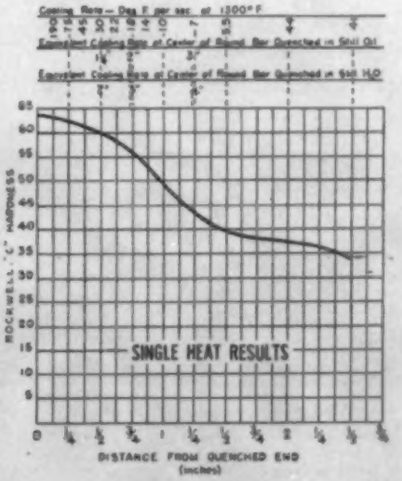


BRINELL 360 321 302 286 269 255 235

As Quenched Hardness 444/460 B.H.N.

N. 1700 - 1" Sq, T. 1200 - 7/8" Rd. T.S. 99,600 Y.P. 78,000 R.A. 62 El. 25 Izod 47

Izod value is average of 5 breaks


Cooling Rate — Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Still H2O
SINGLE HEAT RESULTS
ROCKWELL "C" HARDNESS
DISTANCE FROM QUENCHED END (inches)

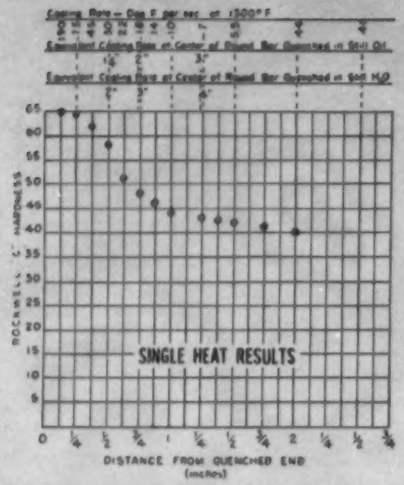
END-QUENCH HARDENABILITY TEST

N.E. 8749
(Type of Steel)

ANALYSIS			
C	0.346	Cr	0.52
Mn	0.85	Ni	0.46
Si	0.23	Mo	0.27
P	0.015		
S	0.015		

Grain Size 7-8
Quenching Temp 1500 °F

Remarks
Held 45 min at temp


Cooling Rate – Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Still H2O
ROCKWELL 'C' HARDNESS
SINGLE HEAT RESULTS
DISTANCE FROM QUENCHED END (inches)

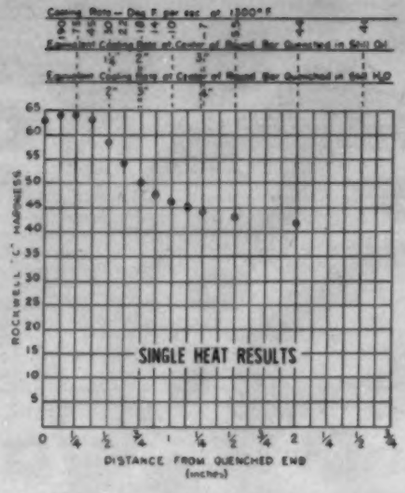
END-QUENCH HARDENABILITY TEST

N.E. 8024 Carburized
(Type of Steel)

ANALYSIS	
C 0.23	Cr
Mn 1.12	Ni
Si 0.30	Mo 0.165
P	
S	

Grain Size 6-8
Quenching Temp 1500 °F

Remarks
Austenitized 1500-1 Hr


Cooling Rate – Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Still H2O
ROCKWELL 'C' HARDNESS
SINGLE HEAT RESULTS
DISTANCE FROM QUENCHED END (inches)

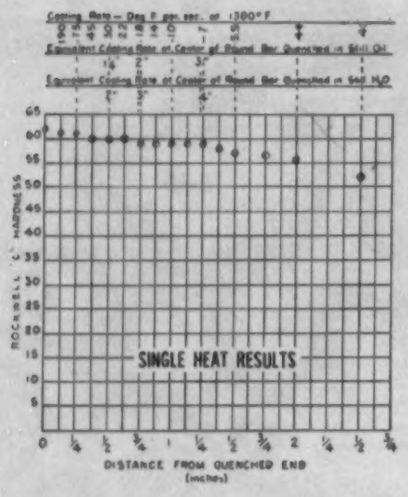
END-QUENCH HARDENABILITY TEST

N.E. 8024 (Carb)
(Type of Steel)

ANALYSIS	
C 0.23	Cr
Mn 1.12	Ni
Si 0.30	Mo 0.165
P 0.017	
S 0.027	

Grain Size 7
Quenching Temp 1700 °F

Remarks
Readings taken .015 below surface. Banding extreme. Deep etch showed slight ingotism. Specimen quenched from box.


Cooling Rate – Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Still H2O
ROCKWELL 'C' HARDNESS
SINGLE HEAT RESULTS
DISTANCE FROM QUENCHED END (inches)

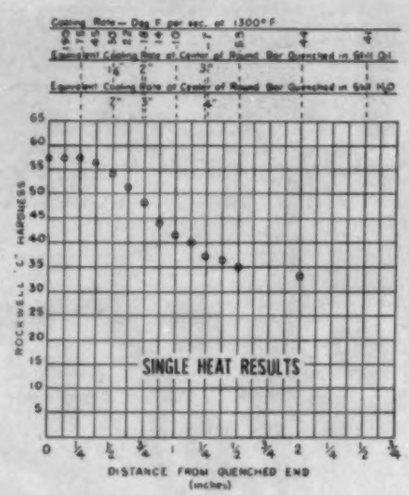
END-QUENCH HARDENABILITY TEST

N.E. 8547
(Type of Steel)

ANALYSIS	
C 0.50	Cr 0.20
Mn 1.50	Ni 0.10
Si 0.17	Mo 0.45
P	
S	

Grain Size
Quenching Temp 1500 °F

Remarks
Hold 1 Hr at temperature


Cooling Rate – Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Still H2O
ROCKWELL 'C' HARDNESS
SINGLE HEAT RESULTS
DISTANCE FROM QUENCHED END (inches)

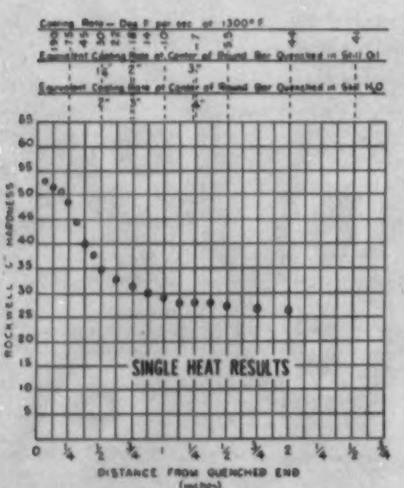
END-QUENCH HARDENABILITY TEST

N.E. 8442
(Type of Steel)

ANALYSIS	
C 0.425	Cr
Mn 1.39	Ni
Si 0.20	Mo 0.355
P 0.018	
S 0.034	

Grain Size 7
Quenching Temp 1525 °F

Remarks
Readings taken .015 below the surface. Banding moderate N. 1600°F 1/2 Hr., reheat 1925. hold 1/2 Hr quench


Cooling Rate – Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Still H2O
ROCKWELL 'C' HARDNESS
SINGLE HEAT RESULTS
DISTANCE FROM QUENCHED END (inches)

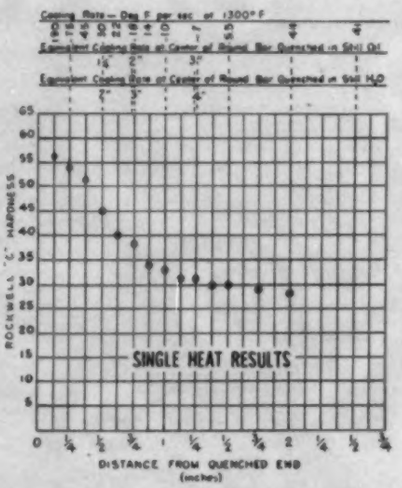
END-QUENCH HARDENABILITY TEST

N.E. 8630
(Type of Steel)

ANALYSIS	
C 0.335	Cr 0.51
Mn 0.88	Ni 0.54
Si 0.33	Mo 0.22
P	
S	

Grain Size 8-7
Quenching Temp 1525 °F

Remarks
Hold 1700-8 Hr. Q 1525
Electric Steel


Cooling Rate – Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Still H2O
ROCKWELL 'C' HARDNESS
SINGLE HEAT RESULTS
DISTANCE FROM QUENCHED END (inches)

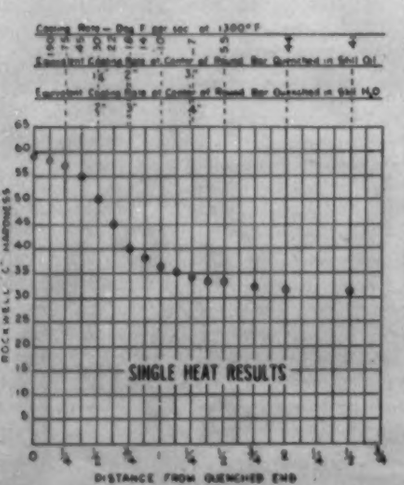
END-QUENCH HARDENABILITY TEST

N.E. 8539
(Type of Steel)

ANALYSIS	
C 0.36	Cr
Mn 1.45	Ni
Si 0.26	Mo 0.24
P	
S	

Grain Size 7/6
Quenching Temp 1300 °F

Remarks
Austenitized 1500-1 Hr


Cooling Rate – Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Still H2O
ROCKWELL 'C' HARDNESS
SINGLE HEAT RESULTS
DISTANCE FROM QUENCHED END (inches)

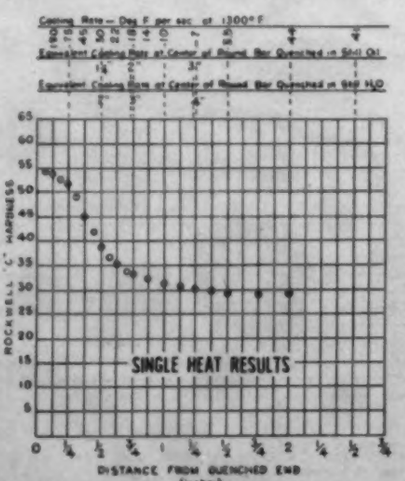
END-QUENCH HARDENABILITY TEST

N.E. 8744
(Type of Steel)

ANALYSIS	
C 0.42	Cr 0.51
Mn 0.85	Ni 0.50
Si 0.29	Mo 0.23
P	
S	

Grain Size
Quenching Temp 1525 °F

Remarks
Hold 1 Hr at temperature


Cooling Rate – Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Still H2O
ROCKWELL 'C' HARDNESS
SINGLE HEAT RESULTS
DISTANCE FROM QUENCHED END (inches)

END-QUENCH HARDENABILITY TEST

N.E. 8739
(Type of Steel)

ANALYSIS	
C 0.37	Cr 0.51
Mn 0.91	Ni 0.54
Si 0.30	Mo 0.25
P	
S	

Grain Size 8-7
Quenching Temp 1500 °F

Remarks
Hold 1700°F. 8 Hr. Q 1500
Electric Steel

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...time is lost and vital materials are wasted!

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For quick answers to many of your Stainless fabricating problems, we offer the Carpenter Stainless Slide Chart. Here you will find answers to questions such as: *How will it weld? How will it machine? How will it solder? Is it magnetic? Can it be heat treated?*

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THE CARPENTER STEEL CO. · READING, PA.

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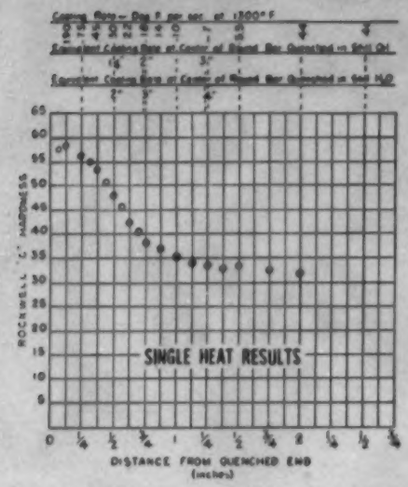

Cooling Rate – Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Gnd H2O
ROCKWELL 'C' HARDNESS
SINGLE HEAT RESULTS
DISTANCE FROM QUENCHED END
(inches)

END-QUENCH HARDENABILITY TEST

N.E. 8744

(Type of Steel)

ANALYSIS			
C	0.44	Cr	0.50
Mn	0.89	Ni	0.58
Si	0.27	Mo	0.25
P			
S			

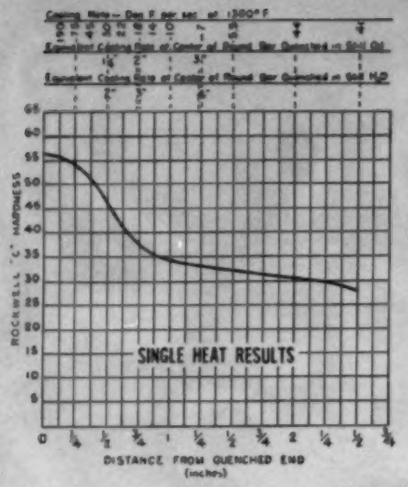
Grain Size 8-7

Quenching Temp 1500 °F

Remarks

Held 1700-1 Hr. 001500

Electric Steel


Cooling Rate – Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Gnd H2O
ROCKWELL 'C' HARDNESS
SINGLE HEAT RESULTS
DISTANCE FROM QUENCHED END
(inches)

END-QUENCH HARDENABILITY TEST

N.E. 8739

(Type of Steel)

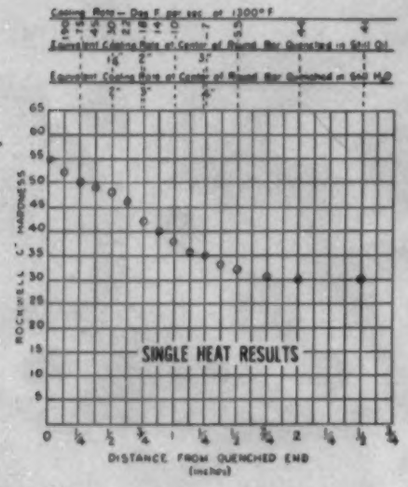
ANALYSIS			
C	0.41	Cr	0.47
Mn	0.86	Ni	0.46
Si	0.31	Mo	0.26
P	0.015		
S	0.019		

Grain Size 7-8

Quenching Temp 1525 °F

Remarks

Held 45 min at Temp


Cooling Rate – Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Gnd H2O
ROCKWELL 'C' HARDNESS
SINGLE HEAT RESULTS
DISTANCE FROM QUENCHED END
(inches)

END-QUENCH HARDENABILITY TEST

N.E. 8124 (Mod)

(Type of Steel)

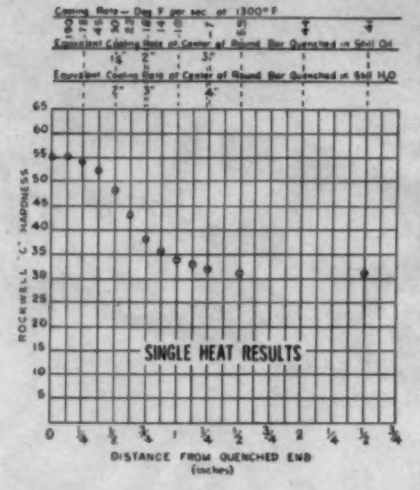
ANALYSIS			
C	0.29	Cr	0.05
Mn	1.64	Ni	0.02
Si	0.24	Mo	0.45
P			
S			

Grain Size

Quenching Temp 1550 °F

Remarks

Held 1 Hr at Temp


Cooling Rate – Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Gnd H2O
ROCKWELL 'C' HARDNESS
SINGLE HEAT RESULTS
DISTANCE FROM QUENCHED END
(inches)

END-QUENCH HARDENABILITY TEST

N.E. 8339

(Type of Steel)

ANALYSIS			
C	0.36	Cr	
Mn	1.45	Ni	
Si	0.26	Mo	0.24
P	0.018		
S	0.024		

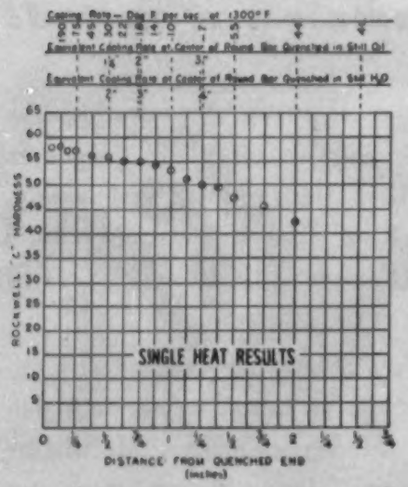
Grain Size 7

Quenching Temp 1550 °F

Remarks

Banding moderate

N 1600 ½ Hr. heat to 1550 hold ½ Hr & quenched


Cooling Rate – Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Gnd H2O
ROCKWELL 'C' HARDNESS
SINGLE HEAT RESULTS
DISTANCE FROM QUENCHED END
(inches)

END-QUENCH HARDENABILITY TEST

N.E. 8442

(Type of Steel)

ANALYSIS			
C	0.41	Cr	
Mn	1.48	Ni	
Si	0.34	Mo	0.36
P			
S			

Grain Size 8-7

Quenching Temp 1500 °F

Remarks

Held 1 hr at temperature

OH Steel

RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE	1750	AIR
ANNEAL		
QUENCH	1550	OIL
TEST PIECE TREATED IN	1" Round	

Estimated Properties

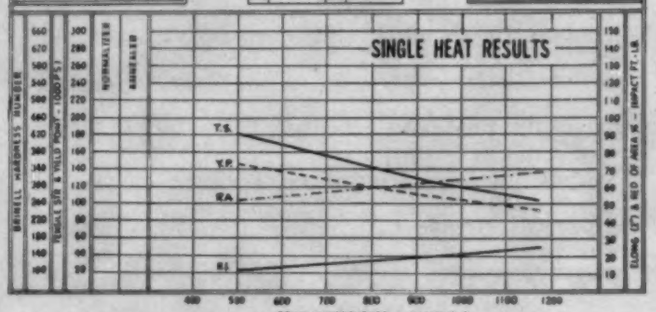
N.E. 8620-8724

Ni-Cr-Mo Wrought Steel

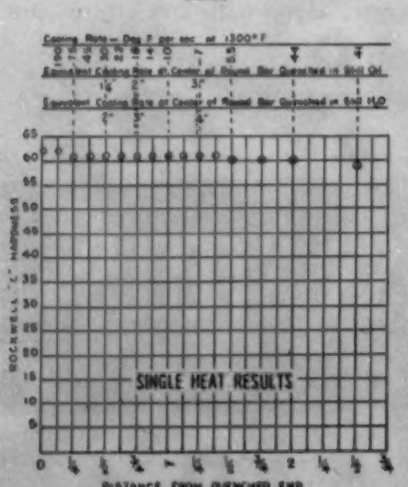
Grain Size 8-7

CRITICAL POINTS °F			
Ac1		Ar1	
Ac3		Ar3	

CHEMICAL SPECIFICATIONS			
C %	0.23	Ni %	0.51
Mn %	0.90	Cr %	0.50
P %			
S %			
Si %	0.32	Mo %	0.25



Brinell H.N.	350					
Hot Rolled 1½" Rd.	T.S.	106,700	Y.P.	73,400	El 22.7	R.A. 59.6	BHN 235
Normalized 1" Rd		99,200	"	46,100	" 27.2	" 47.7	" 197


Cooling Rate – Deg F per sec at 1300° F
Equivalent Cooling Rate at Center of Round Bar Quenched in Still Oil
Equivalent Cooling Rate at Center of Round Bar Quenched in Gnd H2O
ROCKWELL 'C' HARDNESS
SINGLE HEAT RESULTS
DISTANCE FROM QUENCHED END
(inches)

END-QUENCH HARDENABILITY TEST

N.E. 8949

(Type of Steel)

ANALYSIS			
C	0.49	Cr	0.50
Mn	1.11	Ni	0.47
Si	0.28	Mo	0.36
P			
S			

Grain Size

Quenching Temp 1500 °F

Remarks

Held 1 hr at temp

RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE	1650	AIR
ANNEAL		
QUENCH	1500	OIL
TEST PIECE TREATED IN	3" Round	

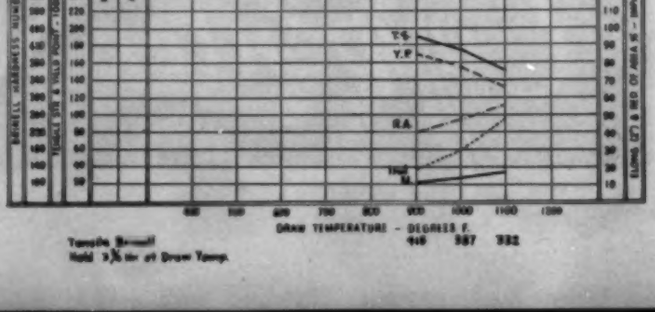
N.E. 8749

Ni-Cr-Mo Wrought Steel

Grain Size 7-8

CRITICAL POINTS °F			
Ac1	1340	Ar1	1210
Ac3	1420	Ar3	1240

CHEMICAL SPECIFICATIONS			
C %	0.546	Ni %	0.46
Mn %	0.85	Cr %	0.52
P %	0.015		
S %	0.014		
Si %	0.25	Mo %	0.27



Tensile Strength

Hold 3½ Hr at Draw Temp.

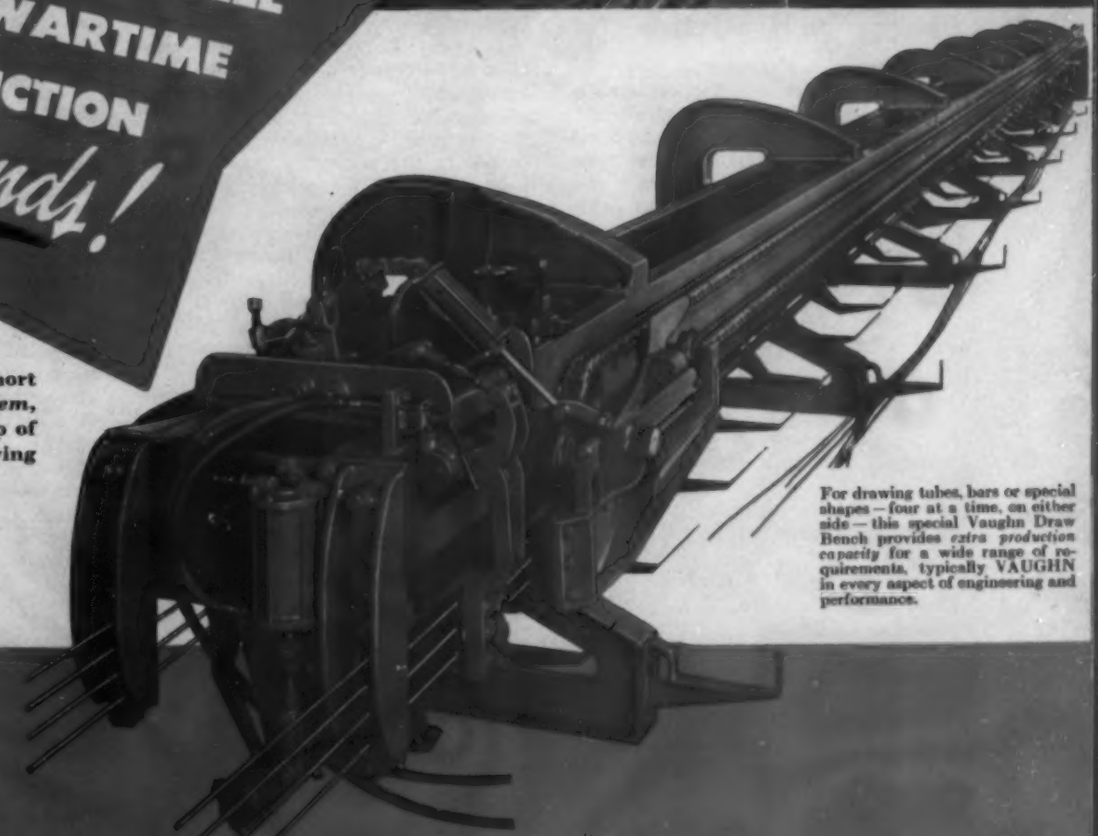
410	387	332

Vaughn

DRAW BENCHES

—SERVE SMOOTHLY and WELL UNDER WARTIME PRODUCTION *demands!*

Make your schedules short as you must—*then beat 'em*, with the dependable help of your VAUGHN Cold Drawing Machinery!



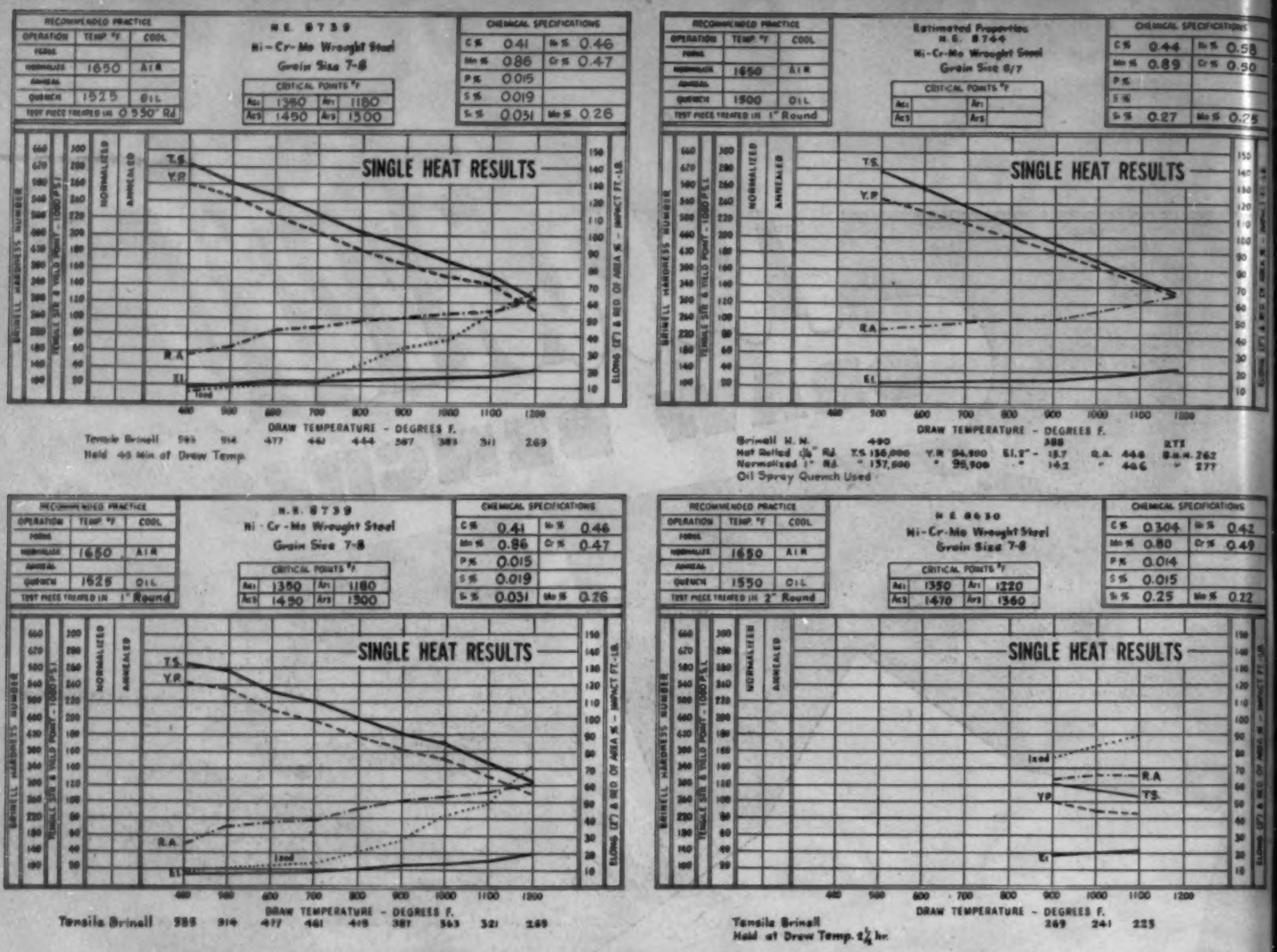
For drawing tubes, bars or special shapes—four at a time, on either side—this special Vaughn Draw Bench provides *extra production capacity* for a wide range of requirements, typically VAUGHN in every aspect of engineering and performance.

COMPLETE COLD DRAWING EQUIPMENT

Continuous or Single Hole ... for the Largest Bars and Tubes ... for the Smallest Wire ... Ferrous, Non-Ferrous Materials or their Alloys.

THE VAUGHN MACHINERY CO.

CUYAHOGA FALLS, OHIO, U. S. A.


N.E. 8739
Ni-Cr-Mo Wrought Steel
Grain Size 7-8
SINGLE HEAT RESULTS
T.S.
Y.P.
R.A.
El.
DRAW TEMPERATURE - DEGREES F.
Tensile Brinell 393 314 477 441 444 367 383 311 269
Held 40 Min. at Draw Temp.
Estimated Properties
N.E. 8744
Ni-Cr-Mo Wrought Steel
Grain Size 8/7
SINGLE HEAT RESULTS
Brinell H.N. 490 388 ZTI
Hot Rolled 3/4" RD T.S. 136,000 Y.P. 94,500 El. 2" - 15.7 R.A. 44.6 B.H.N. 262
Normalized 1" RD " 137,000 " 98,500 " 14.2 " 44.6 " 277
Oil Spray Quench Used
N.E. 8739
Ni-Cr-Mo Wrought Steel
Grain Size 7-8
SINGLE HEAT RESULTS
Tensile Brinell 393 314 477 441 415 387 363 321 269
N.E. 8630
Ni-Cr-Mo Wrought Steel
Grain Size 7-8
SINGLE HEAT RESULTS
Tensile Brinell 269 241 223
Held at Draw Temp. 2¼ hr.

Resistance Heating

(*Concluded from Page 65*)

tages offered by electric resistance heating is the ease with which the final temperature may be controlled automatically by means of the electric eye. Fig. 3 shows such an arrangement designed to handle 6-foot bar stock. As the bars move down the slide, they are picked up by the manually operated rotary conveyor and placed in position between the electrodes of the resistance heater. The operator applies the current by pushing a control button. The bars are heated quickly. As a certain temperature is reached, the electric eye trained on the hot bar cuts off the current automatically.

Use of the electric eye gives assurance that each piece of steel is sent to the forge at the same predetermined temperature, thus prolonging die life and avoiding either underheating or overheating. Such forging heaters can be arranged to heat stock up to 2½ inches in diameter and in any length from 1¼ inches up to 30 feet.

Perhaps the most familiar application of resistance heating—certainly among its earliest—is the heating of rivet ends in hot riveting jobs.. Early designs consisted of a transformer with a low-voltage heavy-current secondary winding of one turn, placed directly over the primary. The rivet was inserted in the secondary circuit and held in place by spring pressure applied by the electrodes. Fig. 2 shows a modern design of rivet heater which brings the rivet up to forging heat in a little over 10 seconds. With current cost at 8.64 mils per kilowatt-hour, the cost of heating is around 17 cents per 100 pounds.

Fig. 1 shows a fully automatic resistance heater in operation on drag link sockets. Stock is placed in the hopper seen in the upper left whence it settles still in the horizontal position, in vertical single file down the outlet spout, rotating cams being used to prevent clogging. The electrodes grip each piece near the end across a diameter. As they open, a pusher moves the lowest slug sidewise over a ledge, from which it drops on a rest which moves with the pusher. The electrodes now close and hold the piece until the electric eye and controller cut off the current from the transformer and open the electrodes. The piece now drops down an inclined roller path and into the chute shown in the foreground and thence into the cup, where it is picked up by the operator and forged.

While many other interesting illustrations of the application of resistance heating in forging might be cited, the general conclusions of users of this type of equipment may be of greater interest. There is general agreement concerning the advantages of light scale, accuracy of temperature control and the ease with which the heat may be confined to that portion of the stock being forged. Then there is a large increase in the comfort of the operator as compared with fuel-fired furnaces. Further, the equipment can be obtained on short notice.

Among the criticisms which may reasonably be offered are certain mechanical difficulties including apparent wear of the electrode parts, causing failure of the grips to function properly, together with certain troublesome contact problems. Then there is some uncertainty concerning the economy of the method in particular cases. And as above indicated, the process is limited to stock of uniform cross-section and moderate diameter.

HAND FINISHING A ZINC ALLOY DIE

ZINC IN WAR

SPEEDING PLANE PRODUCTION

Sand cast dies of zinc alloy are used for stamping many sheet metal aircraft parts. This procedure saves time and money over the practice of machining dies from tool steel. Thus zinc is playing an important role in helping the aircraft industry to meet the demand of our fighting forces for "More Planes—Sooner"

Dies of unalloyed zinc were used in the days of limited aircraft production. But larger production has proved that a zinc alloy, originally developed for the die casting industry by this Company, and known as Zamak, provides additional advantages in the production of stamping dies.

The physical advantages of Zamak alloy dies include greater strength and hardness, less warpage, smoother surfaces and increased wear resistance. All of these factors contribute to longer production life, thereby cutting down the number of dies to be made—and fewer dies mean faster production.

This is just another instance of a peace-time development of zinc being turned to effective use in the War Production Program. It is also one more reason why civilian users of zinc may not be able to obtain all of the zinc products they would like to have.

THE NEW JERSEY ZINC COMPANY

MANUFACTURERS OF THE FAMOUS HORSE HEAD ZINC PRODUCTS

9 STAMPING DIES
GALVANIZING
1 HULL PLATES
2 RUBBER
3 PAINT
4 BRASS
5 CERAMICS
6 DIE CASTING
7 PHARMACEUTICALS
8 METAL SPRAYING

...THE MAKING OF THE DIES

DETERMINING FURTHER FINISHING REQUIRED

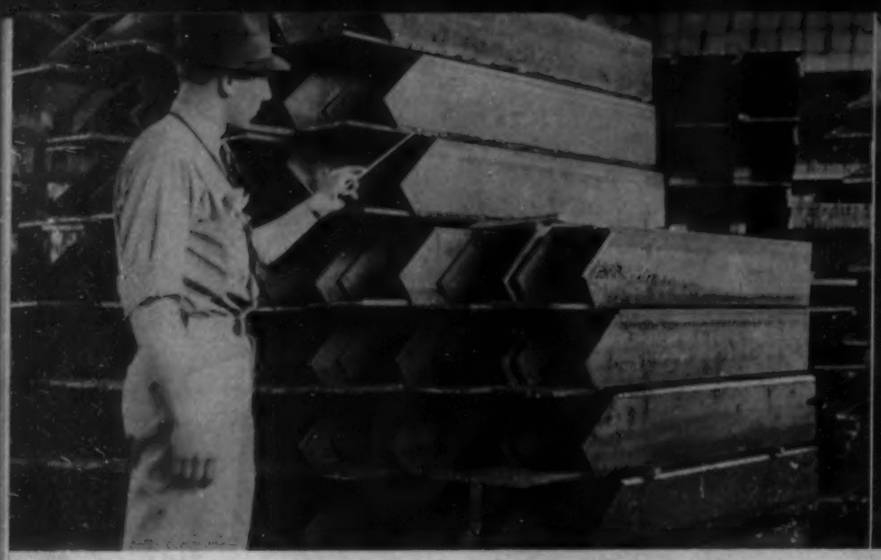


Fig. 1—Some of the box beams fabricated from angles as shown in Fig. 8. Fig. 2—Showing hard facing of scraper blades. The sequence shown in Fig. 9 is followed

Stresses and Distortion in HIGH-SPEED WELDING

By G. G. LANDIS
Chief Engineer
Lincoln Electric Co.
Cleveland

WHILE IT is commonly recognized that stresses and distortion may be present in welding, little difficulty will be encountered in controlling them, provided the job is studied and the proper procedure devised. As a preliminary to a discussion of this subject, attention is called to 10 fundamental considerations:

First, stresses are set up in plates and shapes by rolling, shearing, forming, etc. The partial release of these stresses during welding may be the controlling factor in the final amount of distortion that will occur.

Second, stresses and warping caused by welding can be divided into two classes: First, that which occurs while the welding is in process; second, final stresses and warping that remain after the welded members have cooled to normal temperature. These two classes are somewhat different in magnitude and direction and both should be considered in the welding procedure. The amount of deformation or warping is not necessarily an indication of the value of the stress as the deformation depends on restraint, stiffness, stress distribution and plastic flow.

Third, all other things being equal, an increase in speed will slightly increase the amount of warping.

Fourth, on multiple-pass welds the warping will increase with the number of passes.

Fifth, step-back welding will reduce locked-up stresses and warping as also will skip welding. The latter is due to the more uniform distribution of heat and the greater rigidity of the seam during the welding process.

Sixth, it is always desirable that the direction of welding be away from the point of restraint and toward the point of maximum freedom. In other words, weld away from a welded seam at right angles to the welding.

Seventh, clamping will reduce warping and is more effective when the welded members are allowed to cool in the clamps. However, clamping will not entirely eliminate warping.

Eighth, peening is an effective method of reducing stresses and partly correcting distortion or warping.

Ninth, stresses may be relieved by heat treatment.

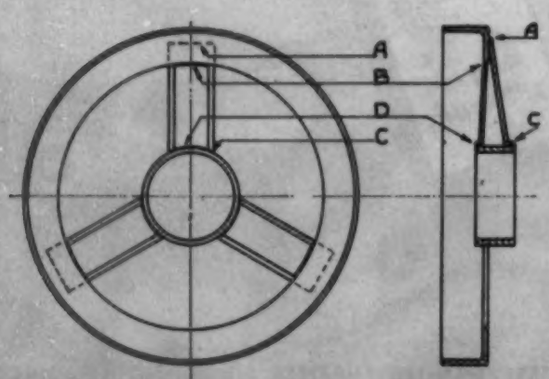
Tenth, stresses may be relieved by mechanical loading.

A few practical examples to il-

Fig. 3—This bearing bracket should be welded in the sequence A, C, D, B if distortion is to be prevented

Fig. 4—Sequence A, B, C, D, caused distortion in this piece, but when A and C were made and allowed to cool, followed by welding B and D, the result was satisfactory

Fig. 5—Distortion is kept less than 1/8-inch by first tackwelding lightly at 11 and 12, then 1 and 2, followed by step-back welding sequence 1-2, 5-6, 9-10, 13-14, 17-18, 21-22, 3-4, 7-8, 11-12, 15-16, 19-20



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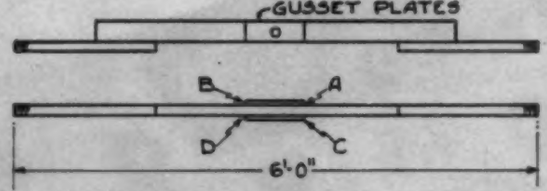

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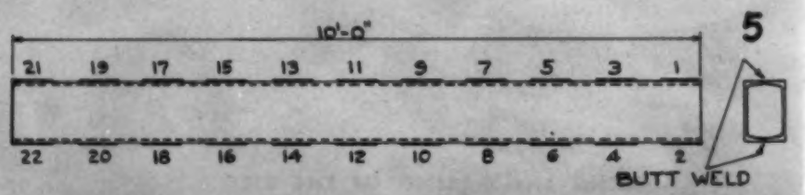


5

Through Worse for Better

Victory is America's boss now, and Victory is rightly a stern taskmaster. Steel that does not go to war must be used to meet the most important civilian needs. Scarcities for many normal uses must get worse and worse.

With you we face interruption of relationships built through a business lifetime. Let us temper this separation with our continued interest, friendly consultation and helpful service to the extent of our ability.

Every minute we must remember that only by complete response to the demands of war today, can any of us be free to resume peacetime tasks tomorrow. Victory demands cooperation through worse days ahead in order to win a better future.

THE YOUNGSTOWN SHEET AND TUBE COMPANY
YOUNGSTOWN, OHIO

25-34E

lustrate these points will be given:

Fig. 3 shows a bearing bracket made of an angle rolled into a circle, a center tube connected to the angle by formed arms. Welds A and B should be made on each arm and allowed to cool. Since the arms are free to move, they will adjust themselves. Then welds C and D should be made. However, welds should be made in the order A-C, D-B.

A similar case is shown in Fig. 4. Welding A-B-C-D in that order caused distortion. But when A and C were made and allowed to cool, followed by welding B and D, the result was satisfactory.

Another interesting case is shown in Fig. 5. This assembly comprises two 6-inch channels welded together to form a rectangular tube. For minimum distortion, a light tack bead is placed at points 11 and 12, then 1 and 2, then 21 and 22. The welding sequence for the step-back method then is: 1-2; 5-6; 9-10; 13-14; 17-18; 21-22; 3-4; 7-8; 11-12; 15-16; 19-20. This minimizes distortion—usually keeping it to within less than ⅛-inch. See consideration No. 5 in the list above.

An interesting example of how distortion is corrected is the case of a bulkhead which warped. A torch, equipped with water spraying device, heats a spot about 1½ inches in diameter in the center of the spray. See Fig. 6. The spray keeps the surrounding plate cool, the center portion reaches a plastic stage, then the locked-up stresses upset the heated metal, resulting in release and redistribution of local stresses. The contraction of the upset metal pulls the plate into shape. Repeated applications may be required if the plate is large or badly distorted. See consideration No. 1 in the list above.

Another similar example is the case of a bent I-beam (or similar section). If the longer flange (convex side) and part of the web are heated, the metal expands and upsets due to restraint of adjacent cooler sections. Upon cooling, the heated metal contracts and pulls the beam into shape. Repeated applications may be required to correct all the distortion. This is practical, however, as the effect of subsequent applications is cumulative.

A counter or opposing effect also is sometimes useful. In welding stiffener plates on girders, for example, considerable warpage may result. This can be minimized by welding both sides at the same time, the welders working opposite each other and using the skip method.

Counter distortion is often employed in erecting items such as a pipe railing. By giving the pipe a slight reverse bend prior to welding and by blowing air through the pipe after welding, the railing straightens itself. This procedure is usually more simple than straightening the railing after erection.

Another interesting example is that of two channels welded to a plate. See Fig. 7. Here trouble was encountered due to breakage in the transverse joints of the plate shortly after welding, due to excessive restraint. See consideration No. 6 in the list at beginning of this article. By running short beads on the plate so as to lift the plate slightly at the transverse joint, this difficulty was corrected by obtaining a better distribution of the locked-up stresses.

In assembly of a part involving several components, it is advisable to keep in mind the suggestion made in consideration No. 6 for it is important to weld from the point of restraint and allow the parts to adjust themselves as welded. For example, the butt joints of flanges and web plates in a girder are made separately. Any additional parts such as flange cover plates, stiffeners and shelf angles on webs and the like should be welded in place before webs and flanges are assembled. If floor beams are to be connected to the girder by welding, the effect of these joints must be considered, as in general they produce the same effect as the welding of web stiffeners.

These examples illustrate the control of distortion which is possible when proper account is taken of the effects of heating and cooling the metal.

Whether or not stress relieving is necessary depends upon the design requirements of the finished structure. It is not required in many cases. In others, a proper peening of the weld may be sufficient. In some instances, stress relieving by heating may be essential. In these latter cases, the types of work involved may be divided into three general classes: First, welded repairs of broken parts and miscellaneous small jobs; second, machinery units; third, pressure vessels built in conformance to the A.S.M.E. boiler code.

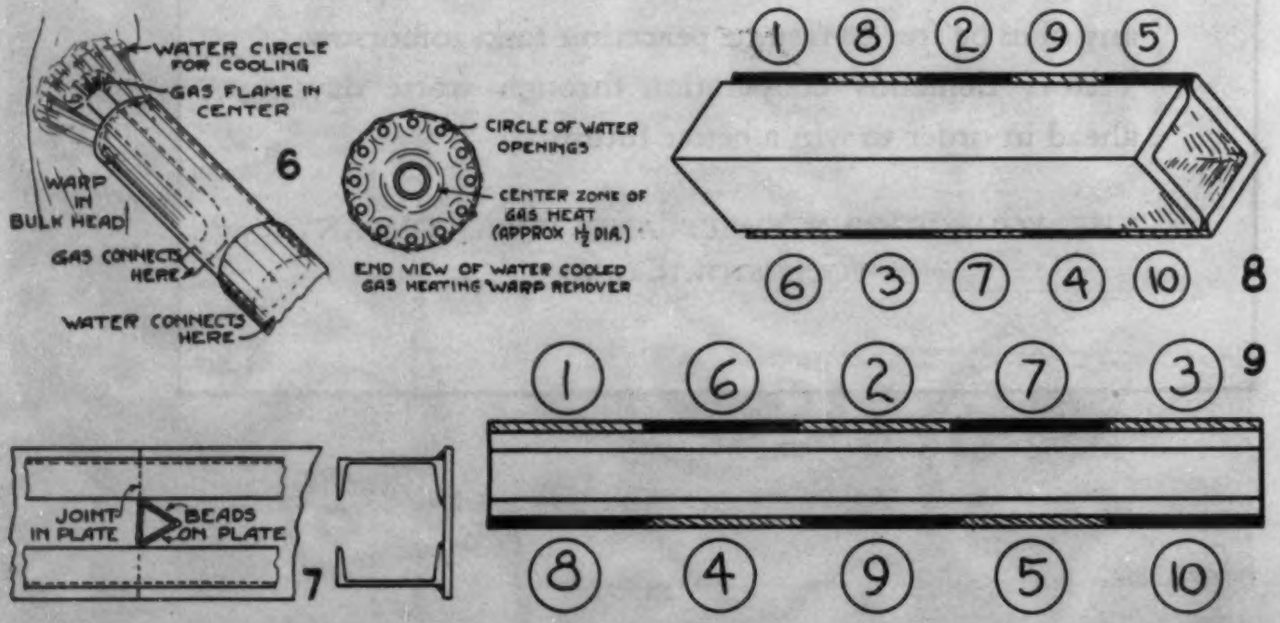
Stress relieving of work designat-

Fig. 6—Heater for correcting distortion combines water spray and torch

Fig. 7—By running short beads on the plate so as to lift the plate slightly at the transverse joint, breakage in the transverse joints shortly after welding was prevented

Fig. 8—This shows the sequence utilized for welding box beams from angle sections. Solid areas show beads deposited first, hatched areas second

Fig. 9—Distortion is prevented in hard facing scraper blades by use of this sequence



The illustration shows R B & W cold-headed bolts being "swaged" — an operation which intensifies the grain of the metal. This permits the ensuing cold forming operation to preserve the tough skin surface — and helps protect against fracture even under unusual stress. Swaging is held to the closest tolerances, both as to roundness and to size—an indication of the "tool-room" precision in manufacturing R B & W bolts and nuts.

Good Grain Is Going Back to the Farm

BACK WHERE THE CORN GROWS straight and tall like armed men . . . where the wind-bent wheat is a limitless sea . . . short parts of tough, close-grained metal are helping to feed America and her Allies.

There, on the farm, the tractor, the threshing machine, the giant corn harvester . . . picking, husking, loading . . . thumping and shaking and straining . . . are worth a platoon of men on the fighting front, and need the same dependability of equipment to keep in fighting trim.

Tough service . . . wresting the stuffs of food from a rugged land. Like the builders of guns and battleships and tanks — of bridges and locomotives — firms manufacturing farm machinery come to R B & W for bolts and nuts.

Strong metal . . . tight-grained, made tighter by bolt and nut making operations . . . promises stiff-willed *holding*, out where the daily bread begins.

For *your* bolt-and-nut-fastened product, order R B & W's Empire Brand. Russell, Burdsall & Ward Bolt and Nut Company. Factories at Port Chester, N. Y., Rock Falls, Ill., Conopolis, Pa.; sales offices at Philadelphia, Chicago, Detroit, Chattanooga, Los Angeles, Portland, Seattle.

RB&W **RUSSELL, BURDSALL & WARD**

Making strong the things that make America strong

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AND ALLIED FASTENING PRODUCTS...SINCE 1845

ed in the first classification may be accomplished by heating the work to slightly above 1100 degrees Fahr. and then allowing it to cool slowly. Cooling should be over a period of at least 10 or 12 hours. In many cases 24 hours of cooling are desirable. Large castings of complicated shape may be cooled for as long as two days. Small pieces, such as butt-welded high-speed tool tips, may be annealed satisfactorily by putting the tool into a box of powdered asbestos immediately after welding and allowing it to cool for 24 hours.

Where available, a furnace should be used for heating. If none is at hand, a temporary one may be built with fire brick without cement. A charcoal or coke fire, or a gas or oil torch may be used to furnish the heat. After the proper temperature has beeen reached, the furnace should be closed and allowed to cool slowly. If charcoal or coke has been used, the work should be covered with ashes and embers when cooling. Sometimes the work is covered with clean sand or slaked lime to retain the heat.

Stress relieving of machinery units may or may not be required. In many cases a mechanical stress relieving by peening each layer, preferably with compressed air and a roughing or peening tool, is entirely satisfactory.

In some cases where heavy plates or a heavy welded section is used or where the assembly is subjected to severe loads and stresses, it may be desirable or necessary to stress relieve by heating.

On structures built of heavy plates, it may be necessary to stress relieve before the weld is entirely completed. It is usually regarded as good practice to stress relieve after the deposit of weld metal has been built up to approximately 1¼ inches in depth, and again for each 1 to 1½-inch additional thickness of weld metal.

New Booklet Outlines Care of Belting

"Care and Maintenance of Conveyor and Elevator Belting" is the title of a new 24-page catalog recently issued for industrial executives by B. F. Goodrich Co., Akron, O. It embodies important instructions for the care and maintenance of belting as well as chapters containing a wide range of belt data.

Subjects discussed include "Why the Care of Belts is Worth While", "Belting Wear at Loading Points", "Making Conveyor Belts Run Straight", "Hazards to Belts on Portable Conveyors", "How To Install Conveyor Belts" and "Vulcanized Splices and Repairs". Copies of the booklet are available free upon request.

THE RHEOTRON

An Important New Research Tool

AN IMPORTANT new research tool, according to Dr. W. D. Coolidge, director, General Electric Research Laboratory, Schenectady, N. Y., is the Rheotron, developed by Dr. Donald W. Kerst of the faculty of University of Illinois, Urbana, Ill., working with engineers and scientists of the General Electric laboratory. It produces an electron stream far more penetrating than the electrons from radium.

Upper view, close-up of heart of new rheotron. A research worker is making an adjustment to the massive yet delicat equipment

Lower view, in the rheotron, electrons are accelerated in this doughnut-shaped glass vacuum tube to the highest speed ever produced by man-made apparatus. They are given an energy corresponding to 20 million volts

Electrons, the smallest negatively charged particles in matter, are given an energy corresponding to 20,000,000 volts, producing an X-radiation equal in intensity to the gamma radiation in a corresponding beam from more than 1000 grams of radium, which is greater than the world's existing supply. Electrons have already been given sufficient velocity to penetrate an inch of aluminum. Radiations from the machine have made copper radioactive, transmuting the metal to a form which has some of the characteristics of radium for a few minutes. Work already has been started on a larger model to cost more than a quarter of a million dollars and designed to whirl electrons to an energy of 100,000,000 volts.

A doughnut-shaped glass vacuum tube between the poles of an electromagnet 5 feet long, 3 feet high and 2 feet wide is the heart of the Rheotron. The pole faces which sandwich the vacuum tube are 19 inches in diameter. The tube has an outside diameter of 19 inches, an inside diameter of 11 inches and is about 2 inches in thickness.

Electrons from a hot filament within are whirled around the vacuum tube and are steadily accelerated by electromagnetic forces. Magnetically guided, each electron travels along a circular path for about 400,000 revolutions, receiving as much as a 70-volt push each time around, and traveling some 200 miles in a small fraction of a second to gain a speed closely approaching 186,000 miles per second, that of light. This is the highest speed ever produced by a man-made apparatus. It is achieved not by applying the entire voltage at once, but by building up the speed steadily.

"Hitherto," according to Dr. Coolidge, "experiments with high-velocity electron beams have not kept pace with experiments done with positive ions from the cyclotron. The cyclotron is incapable of accelerating electrons, and previous devices able to do so have seemed to reach a practical limit at something like half the voltage of the present accelerator. The Rheotron seems to have no such limit, and its effective voltage can apparently be increased indefinitely."

This possibility of generating intensely penetrating rays may greatly extend several fields of metallurgical research.

THE TANKS ARE COMING

...Diesel Powered.

Ohio Seamless Tubing is Vital to Powerful Diesel Engines...

When American machines roll out onto the battlefield they not only must have a tough shell, but they must also have the built-in ability to take it.

That's where Ohio Seamless Tubing plays its part in mighty Diesel-driven tanks. For such vital parts as high pressure fuel lines and fittings, lubricating oil lines, gear shafts, wrist pins and many others, the responsibility for stress-resistance falls squarely on Ohio Seamless Tubing. And just as it has proven its worth in action on the fighting front, Ohio Seamless Tubing has proven itself on the production line. It takes to machining, to bending into necessary shapes. It meets strict Army and Navy specifications. It's uniform as to workability, as to accuracy of size and gauge.

Ohio Seamless is found in many other products where its quality, precision-workmanship and strength are telling blows in America's favor. You'll find these same characteristics will fill the bill for quality-quantity production in peacetime manufacture.

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J-M SUPEREX

. . . the most widely used block insulation for temperatures between 600° F. and 1900° F.

Throughout the Iron and Steel industries, J-M Superex has long been recognized as the standard block insulation for temperatures up to 1900° F. behind refractory linings.

Made of high-quality, calcined diatomaceous silica, bonded with asbestos fiber and formed into large, easily handled blocks, Superex provides both high heat resistance and exceptional insulating efficiency. For complete information, write for IN-101A. Johns-Manville, 22 East 40th Street, New York, N. Y.

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LOW THERMAL CONDUCTIVITY—the billions of tiny "dead air cells" in J-M Superex present a formidable barrier to the passage of heat . . . are largely responsible for its low thermal conductivity.

HIGH HEAT RESISTANCE—J-M Superex Blocks safely withstand temperatures up to 1900° F

LIGHT WEIGHT—Approximately 24 lbs. per cu. ft.

HIGH PHYSICAL STRENGTH—Withstands vibration and other physical abuse encountered in normal service. Approximately 4 tons pressure per square foot are required to compress Superex ⅛ inch.

PERMANENT EFFICIENCY—Superex maintains its high thermal efficiency indefinitely—will not disintegrate in the service for which it is recommended.

QUICK APPLICATION—The convenient sizes and light weight of Superex assure fast, economical installations.

EASY CUTTING AND FITTING—Superex may be easily cut with an ordinary knife or saw for fitting around openings or irregular surfaces.

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NEW LEAD-SCREEN X-RAY TECHNIQUE

. . . . simplifies X-ray work, saves vital war material

By HERBERT R. ISENBURGER
St. John X-Ray Service Inc.
Long Island City, N. Y.

WHILE the use of lead foil sheets as intensifying screens is just as old as industrial radiography itself, this technique has been confined to aluminum and magnesium alloys primarily. It was not until the faster "screenless" X-ray film came on the market in recent years that we could consider the use of lead screens for other types of X-ray work.

Briefly, this is the exposure arrangement. The X-ray tube is on one side of the object, and the film, sandwiched between a pair of lead screens, is placed on the other side of the object as closely as possible. After the X-rays have penetrated the material under examination, the radiation which has not been absorbed by the object reaches the film holder and the following process takes place:

The long wave rays will be absorbed by the lead screens, especially by the front one. The remaining portion of the radiation will excite the lead particles in the screens to produce a secondary radiation to which the film emulsion is more sensitive than to X-rays themselves. The photographic image thus is intensified by the use of lead screens. Just to what extent this action takes place can be observed in the following experiments.

Tests were performed on aluminum and steel objects, using the same exposure conditions, namely: 28-inch focus-to-film distance, 1-minute exposure time, 150 kilovolts and 4 milliamperes. While the thickness of the aluminum specimen was 2 inches, the steel plate was only ¼-inch thick. Both specimens were 10 x 12 inches.

It is interesting to note, in this connection, that the weight of the aluminum (24 pounds) is about three times as great as that of the steel plate (9 pounds); and if we multiply these actual weights by the respective densities of the metals (aluminum, 2.7 and iron, 7.6), we find that the products are approximately the same. Therefore, about eight times as great a thickness of aluminum can be penetrated to obtain the same radiographic result.

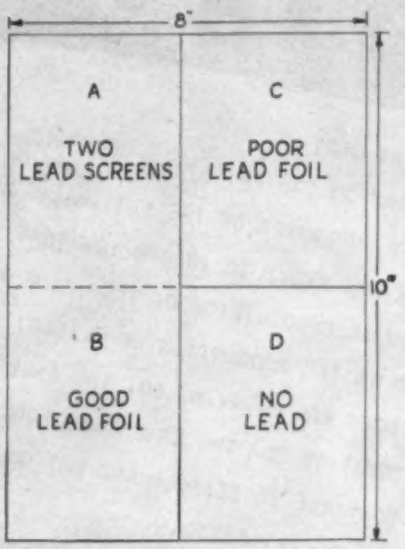

Fig. 1—Plan showing arrangement of the lead screens. The good lead foil covers the left vertical half, the poor foil covers the top horizontal half

In our tests, the film was placed in an exposure holder with two pieces of lead foil, 0.005-inch thick, as shown in the diagram, Fig. 1. The 4 x 10-inch strip of foil across the left half of the plate in Fig. 1 is a perfect screen with a tin coating of 0.00015-inch, whereas the 5 x 8-inch strip across the top half of the plate in Fig. 1 is imperfect with a nonuniform and thin tin coating.

Two exposures were made with both the aluminum and steel specimens. The first exposure in each case with the good 4 x 10-inch foil in front of the film, facing the X-ray tube, and the unsatisfactory 5 x 8-inch lead screen in back of the film. The second exposure was made with the same foils but with the 4 x 10-inch foil in back and the 5 x 8-inch foil in front of the negative.

The results are shown in the accompanying exographs, Figs. 2a, 2b, 3a and 3b. The sensitivity in each area is indicated by how dark that portion is. These indicate:

First, the unsatisfactory grain structure of the 5 x 8-inch lead screen practically disappears when the foil is placed in front of the film. This result is better on steel than on aluminum.

Second, in the case of aluminum, greater speed is gained by the use of but one lead screen in back of the film. When using two screens the speed is about the same as when no lead is employed, and the film is decidedly slower with one lead screen in front of it.

The result for steel varies since the slowest portion of the film is

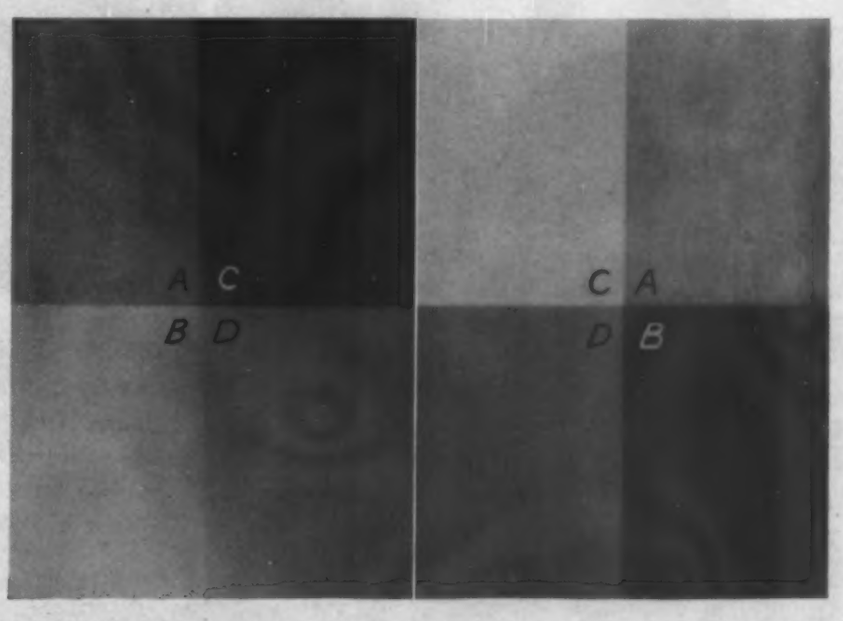

Fig. 2a—Left, shows exposure made with good foil in front of film, facing the X-ray tube, the poor foil being in back of the film. In Fig. 2b, right, the position of the two foils is just reversed. Both of these were through the aluminum specimen

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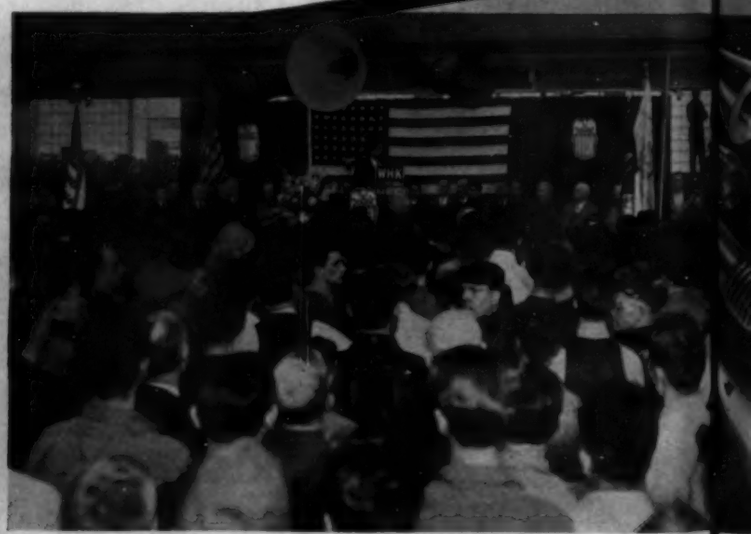

AT PRESENTATION ceremonies in National Acme plant, F. H. Chapin, President (center) and M. Bizovsky, local MESA president (left), accepted the award on behalf of their fellow workers. To James Forrestal, Under-Secretary U. S. Navy, and Col. S. E. Reimel, Army-Navy Munitions Board, they pledged continued full support of Nation's war effort.

WORKERS CHEERED compliments on their achievement by Cleveland's Mayor F. J. Lausche (speaking) and by high-ranking Army and Navy officers. They went back to their jobs with renewed determination to beat their phenomenal machine and tool production record, which has already increased over 600%.

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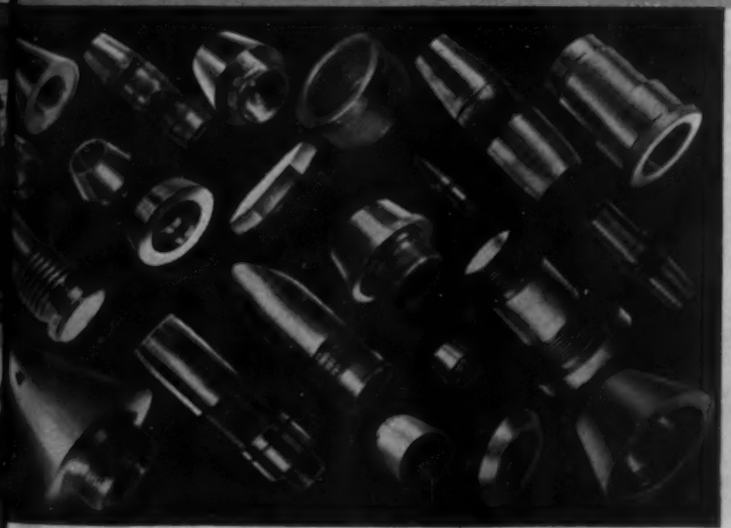
...our inspiration to even greater effort

PROUDLY now the Army-Navy Star burgee flies over NAMCO plant; proudly, too, every man will wear a lapel button denoting his part in the primary job of getting munitions and equipment to the men at the fighting fronts.

"MORE Output Per Day and More Bonds Per Pay" is the slogan at The National Acme Co. Subscriptions via pay roll deductions alone now exceed $10,000 per week. Photo shows Harry Mack, father of a U. S. Navy volunteer, buying another war bond.

AXIS-BUSTING munitions parts shown below are but a few of many now being made on Acme-Gridley Bar Automatics to exacting U. S. Army and Navy specifications. 42 years of successful experience stand behind today's amazing speed, accuracy and low operating cost of these machines.

SPEED—ever greater speed—but at no sacrifice of accuracy—is today's vital war production demand. And Acme-Gridley Automatics are helping to meet the Nation's need by sustaining accuracy at fastest feeds and highest spindle speeds that modern cutting tools can safely stand.



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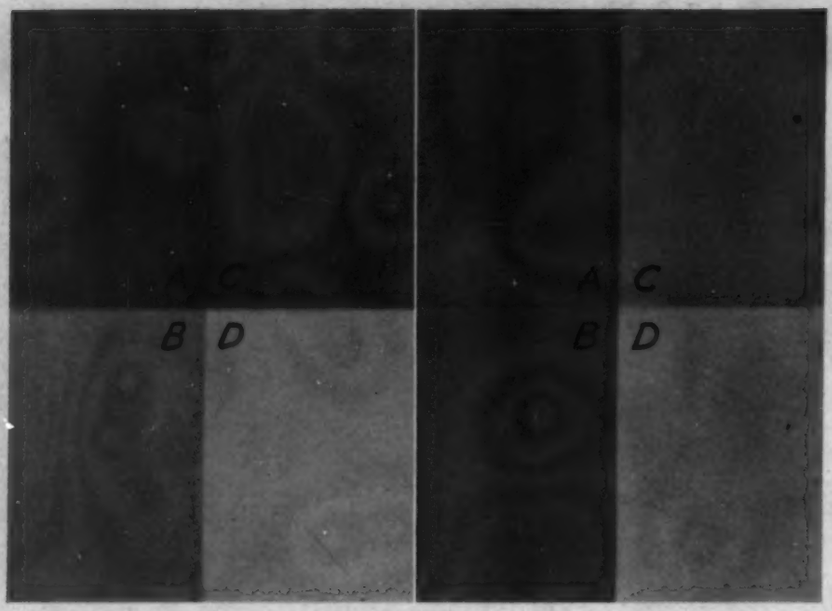

Fig. 3a—Left, exposure made with good foil in front of film, poor foil in back. In Fig. 3b, the position of the two foils is just reversed. Both of these exposures were through the steel specimen

the section without lead. When a screen is introduced in front of the film, the speed increases. While the greatest speed is obtained with two lead screens, it is evident that little can be gained by it over the result obtained with just one lead screen in back of the film.

In the new lead-screen technique we are employing but one lead foil in back of the film, which should preferably be of the screenless type. The advantage is not only a saving of vital war material, but it is also possible to bend the film holder without damaging the film or screen. This is important for numerous applications on aircraft, ordnance and marine equipment and materials. There is no limit as to thickness in the inspection of light-weight materials. On steel and heavier metals, the kilovolt output of the X-ray machine is the only limiting factor with this lead-screen technique.

Regular exposure charts (*Industrial Radiography*, St. John & Isenburger, John Wiley & Sons, New York) are based on the use of intensifying screens. When employing lead-screen technique, the voltage should be increased 50 per cent or the time of exposure must be raised about five times. One can also decrease the focus-film distance 25 per cent and increase the voltage 10 per cent to obtain approximately the same results as with intensifying screens. Contrast and definition are nearly the same in either method, provided the proper film-screen combination is used to suit the exposure best.

Credit for this work is due the Federal Security Agency, United States Office of Education, Washington, for the authorization of an Engineering Defense Training Course at Columbia University.

Navy Recognizes Additional Firms with "E" Award

Recognizing outstanding production of war materials, the Navy has granted its coveted "E" burgees to additional companies.

Accompanying photo shows C. N. Boylan, manager, Staten Island Yard, Bethlehem Steel Co., Shipbuilding Division, displaying the pennant recently presented to his company by Rear Admiral George H. Rock, retired. Sitting just behind Mr. Boylan (with hat on) is A. B. Homer, vice president, Bethlehem Steel Co.

Huntington, W. Va., works of International Nickel Co. received the All-Navy "E" June 10.

One of the first companies in the Columbus, O., district to receive the "E" was the Jeffrey Mfg. Co. Farrel-Birmingham Co. Inc., Ansonia, Conn., recently received the award for three of its plants, at Ansonia, Derby, Conn., and Buffalo. Charles T. Brandt Corp., Baltimore, also is a recent recipient.

Howard Foundry Co., Chicago, and its subsidiary, Aurora Bronze & Aluminum Co., Aurora, Ill., received news of the "E" award to them on the company's twenty-fifth anniversary. A. Finkl & Sons Co., also of Chicago, has received the pennant, and their employes the navy "E" lapel buttons.

Two Cleveland firms, Clark Controller Co., and Moto-Truc Co., earned the award for outstanding performance on Navy contracts. Bausch & Lomb Optical Co., who were awarded the pennant last summer, have been awarded the All-Navy "E" burgee with star.

American Brass Co.'s Detroit plant was awarded the "E" June 6. Renewal of the citation has been announced by American Locomotive Co., New York, which first was presented the honor in October, 1941. De Laval Steam Turbine Co., Trenton, N. J., has been presented the "E" for excellence in output of geared turbine propelling equipment and pumps.

Harrisburg Steel Corp., Harrisburg, Pa., which received the Navy "E" April 22 has issued an attractive photo-review booklet of the ceremonies which is being distributed to all employes.

CLARK CONTROLLER COMPANY

BREAKS "Bottle-necks" WITH SMALL LOTS, SHORT RUNS

• Operators like Clevelands for the reason that they can average more pieces per hour—and there is little down-time for machine casualties because Clevelands are built sturdily and dependably to stand up under extreme service demands. • With literally a thousand-and-one electrical control devices to manufacture, Clark Controller Company relies on Cleveland Model A *Single Spindle* Automatics for *small lots and short runs* of a variety of parts. • Here a battery of 1 1/16-inch capacity Model A machines were crowded a little closer together to add a new one recently, and production goes on at top speed with skillful operators just old enough to vote! Ask for information about application of Clevelands to your *short run, small lot* production.

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CLEVELAND

Single Spindle

AUTOMATICS

Interprocess Cleaning of CARTRIDGE and SHELL CASES

By G. RUSSELL HERSAM
Technical Research Laboratory
Oakite Products Inc.
New York

. . . . employs drawing lubricants which emulsify or are soluble in water, to simplify cleaning operations. Low brass-staining tendency of cleaning materials is important factor in their selection

CLEANING plays a frequent as well as important part in production of brass cartridge and shell cases. (For further details on cartridge and shell case manufacture and cleaning, see STEEL, April 28, 1941, p. 52, and Dec. 29, 1941, p. 54.) Such cases are drawn from brass disks. An initial cupping operation is followed by a variable number of redraws, depending on the size of the case and the available press equipment. The flat brass disks are stacked in the background of Fig. 2, with cups from the first forming operation in the foreground. Cupping is shown diagrammatically in Fig. 4 and pictorially in Fig. 1.

It is of the utmost importance that the cleaning characteristics of the lubricants required for the drawing operation receive careful consideration at the time of drawing compound selection. If easily removable compounds are not chosen, considerable difficulty may be experienced in the pickling and washing operations which immediately follow each anneal.

A dilute soap solution or a paste compound mixed with water is often used for drawing small arms cartridge cases. For medium and large-size cases, a heavier lubricant is necessary. One of the water-emulsifying type is desirable since after each draw the cases are usually given only a hot-water wash before annealing, and this will suffice to remove the bulk of the residual compound on the cases before they go into the annealing furnace. If an oil lubricant is used in drawing, more effective cleaning must be provided at this point as hot-water washing is inadequate and the unremoved oil will cause staining and surface roughening of the cases during annealing.

Once the drawing compound is selected, control methods should be instituted which guarantee uniformity of the solution day after day or trouble may be encountered in the pickling and washing operations following the anneal.

The setups for pickling and washing after annealing between draws depend on the size of case being made. Cases for artillery shell and other large sizes are usually packed into metal baskets by hand. They proceed through the annealing furnace and then through pickling and wash tanks in the same container with no need for rehandling. Cases for small arms (cartridge cases) such as those of .30 and .50-caliber are usually tumbled in revolving-drum type machines—which provide for pickling, rinsing and washing in successive compartments.

Sequence for Cleaning Shell

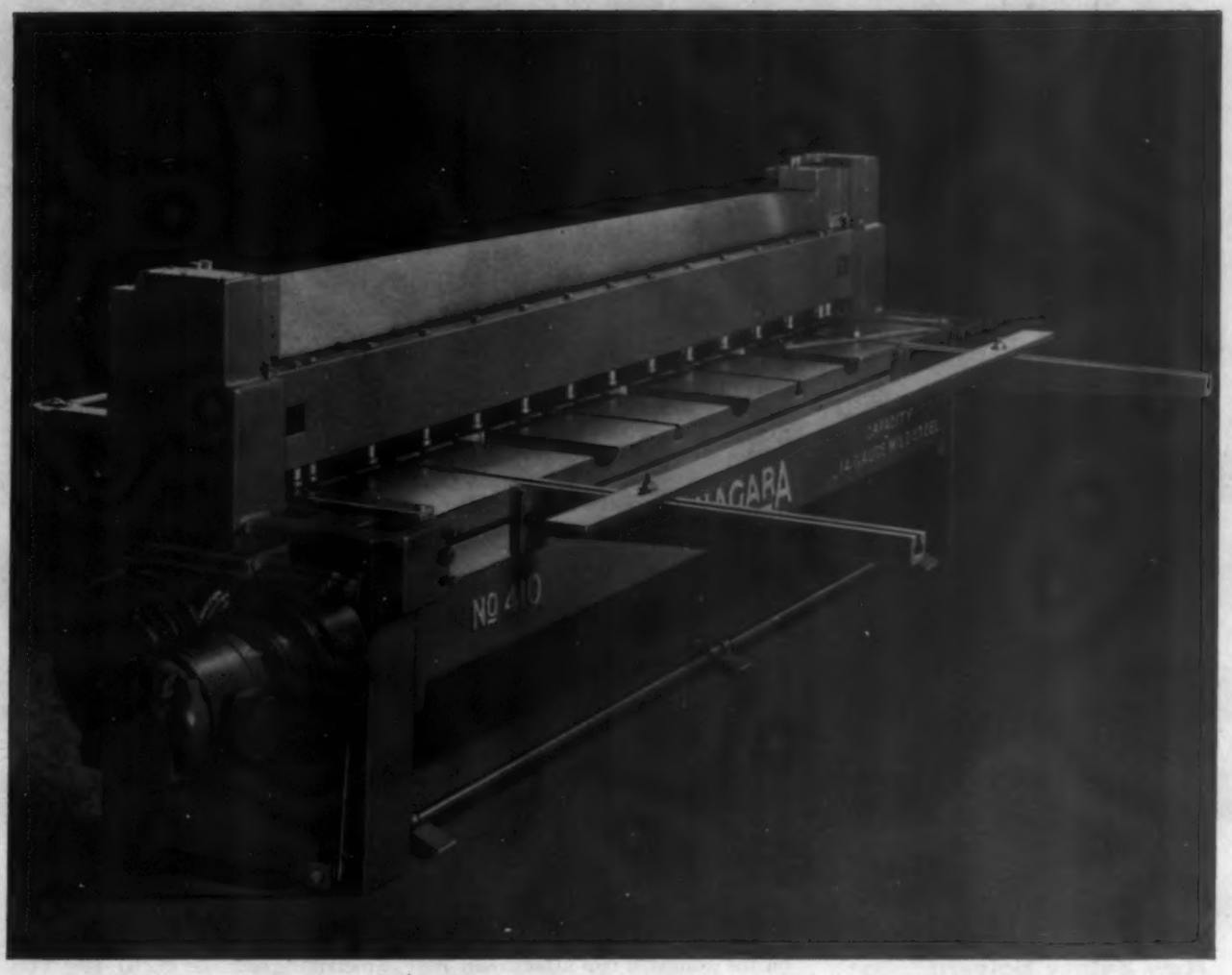
This discussion will confine itself to the cleaning of larger cases (shell cases). The average pickle and wash procedure for these cases calls for the following series of operations: First, the cases are sprayed with cold water immediately after annealing. Next they are immersed in a pickle tank, which usually contains a 5 to 12 per cent solution of hot sulphuric acid. Pickling time varies from 3 to 15 minutes. This is followed by a cold-water rinse, after which comes a wash and then a hot-water rinse. Baskets of cases are usually handled through this sequence by means of an electric hoist and trolley arrangement.

The washing solution employed after pickling usually contains both soap and a suitable alkaline material. One of the fundamental factors to be considered in selecting the alkaline material is that it must have a minimum tendency to stain brass.

After the cases have been annealed following the final redraw, they go directly to the trimming operation without a pickle and wash. In many instances they then proceed directly to the heading operation, but it has been shown well worth while to introduce a cleaning operation at this point to be sure the interior is free of all grease and oil. If this is not done, the grease or oil present may cause the case interiors to assume a granular appearance during the heading operation. This makes inspection difficult, with the possibility that the condition may be judged as a heading defect such as a fold or

Fig. 1. (Upper left)—Punch is about to descend upon brass disk to form the cup. Photographs courtesy Oakite Products Inc., 22 Thames street, New York

Fig. 2. (Lower left)—Brass blanks and the cup shapes formed from them



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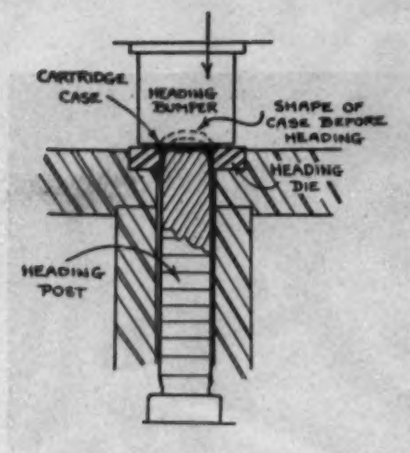


Fig. 3. (Upper diagram)—After the final redraw and trimming operation, heading is performed as illustrated. Drawing compound is applied to the case base for this operation

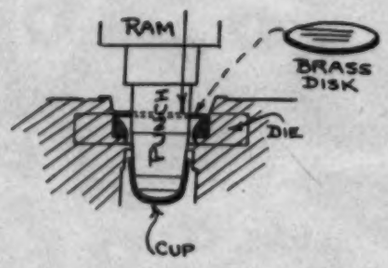


Fig. 4. (Lower diagram)—In the cupping operation the punch forces the brass disk through the die to form the cup

crack, with the consequent rejection of such cases.

For the heading operation, the base of each case is given a light application of drawing compound paste to assist the spreading of the metal toward the outer case edge while pressure is being applied in the press. See Fig. 3. After heading, the cases are annealed in molten saltpeter to prepare the metal for the tapering operation which follows.

To remove the residual salt after this anneal, the work is plunged into a cold-water bath, then a hot-water rinse to facilitate drying. Sometimes a mild alkaline cleaning is given the parts before the hot rinse to insure complete salt removal.

The tapering operation now requires proper lubrication of the case side walls, and here as well as in the heading operation the lubricant again should be one easily removed in available cleaning solutions.

Next comes finish machining, which as a general rule is carried out on flat turret lathes. Successive turret operations face and turn the head, drill, ream and counterbore the primer hole, while a stationary tool on the lathe trims the case to required length. Cleaning follows, and the cleaning solution must quickly and economically remove the lubricants used in heading, tapering and machining. If these compounds have been carefully selected, the provision of the necessary cleaning action is a simple matter and the main considerations in cleaning material selection are the brass-staining tendencies, free rinsing qualities, economy and safety factors of available compounds. Tank cleaning is usually employed, but automatic washing machines can be expected to come into more general use in the future.

Mouth annealing in a saltpeter furnace now renders the metal sufficiently ductile so that cracking is avoided after the projectile has been inserted into the case to provide a complete round of ammunition. Now comes the final cleaning operation, the solution used usually being the same type as that used after finish machining.

Depending upon the variations in operations which are found from one plant to the next, cleaning costs should range from 6 to 10 cents per 1000 cases cleaned. Final operations resulting in a finished case consist of stress-relief annealing at low temperature, stamping of necessary identification data on the case base, and final inspection. In some plants, sand and sawdust buffing of the cartridge case interiors is carried out before inspection. In either instance, cases are packed for shipment after inspection.

New Safety Solvent Useful in Shell Plants

Curran Corp., Malden, Mass., recently developed a new hand-wiping safety solvent which can be used to remove cosmoline out of rifles issued to troops. It also is applicable for wide industrial use for grease cleaning and hand-wiping operations in ordnance factories or shell plants.

The new solvent is to be marketed under its blanket trademark of Gunk XP-92. It is a concentrate used diluted with water. In spite of its high solvency against mineral oil or dirt, the solvent does not de-oil the skin, has no toxic vapors, no flash or fire point and leaves an invisible rust preventative film so thin it cannot be detected, the company reports.

Offers Can Adapter As Paint Cup Substitute

Due to the shortage in aluminum for paint cups, Binks Mfg. Co., 3114-40 Carroll avenue, Chicago, is offering finishers a can adapter which virtually converts the original paint container into a paint cup on the gun. The adapter fits on the standard cup attachment for spray guns, and will lend itself for use with any standard-type paint can.

According to the company, a limited supply of these adapters is available without any priority rating, and they will be furnished on a "first come—first served" basis as long as the supply lasts.

Correction

In an article entitled "Silver Plating as a Substitute in the Present Emergency", which was published in the April 20 issue of STEEL, Dr. C. B. F. Young referred to indium as follows:

"Indium is a soft rare metal of the zinc group selling for $7 per ounce. It can be cut with the finger nail. It does have some industrial application when used in conjunction with silver. However, this use involves a heat-treating operation which is not desired. This material does have possibilities, however."

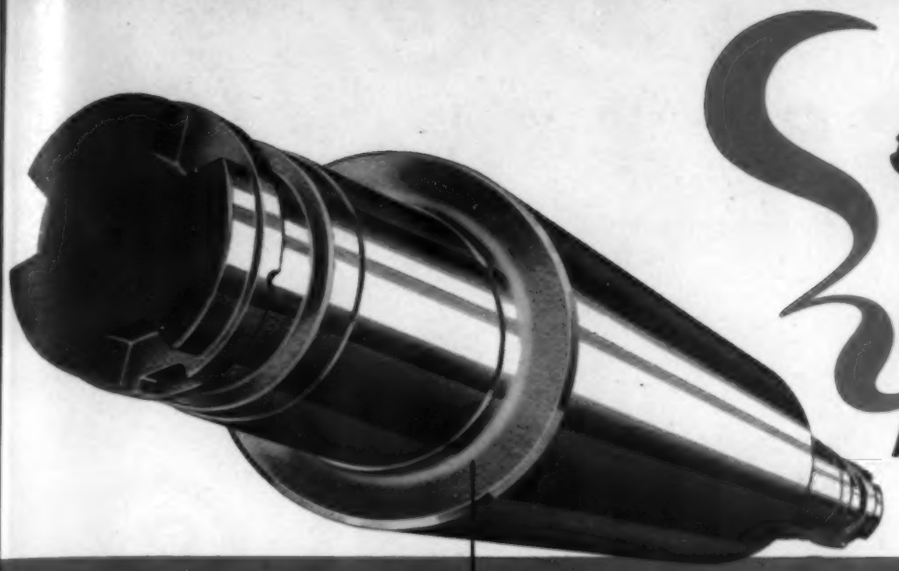
In commenting on this statement, the Indium Corp. of America, 60 East Forty-second street, New York, pointed out that the above price was in error. The correct price of indium metal of the commercial grade is $12.50 per Troy ounce, while indium chloride suitable for the company's patented plating process sells for $7 per Troy ounce. Dr. Young advises that his original reference to the price was incorrect and that the prices thus quoted by the company are the going figures.

At the same time, the Indium Corp. of America regretted Dr. Young's statement that the heat-treating operation in connection with indium plating is not desired since "this process is in wide use today in many industries and the indium plated and diffused surfaces are giving excellent results, both as to wear and resistance to corrosion.

In addition the surfaces thus obtained surpass chromium and nickel in appearance."

To the latter statement, Dr. Young replies: "I do not want to make two different platings and then follow with a heat-treating operation when I can produce a protective coating with just a single plating operation."

Editor's Note: Now in process of preparation is an article describing case histories on experience with indium plating at a number of representative metalworking plants.



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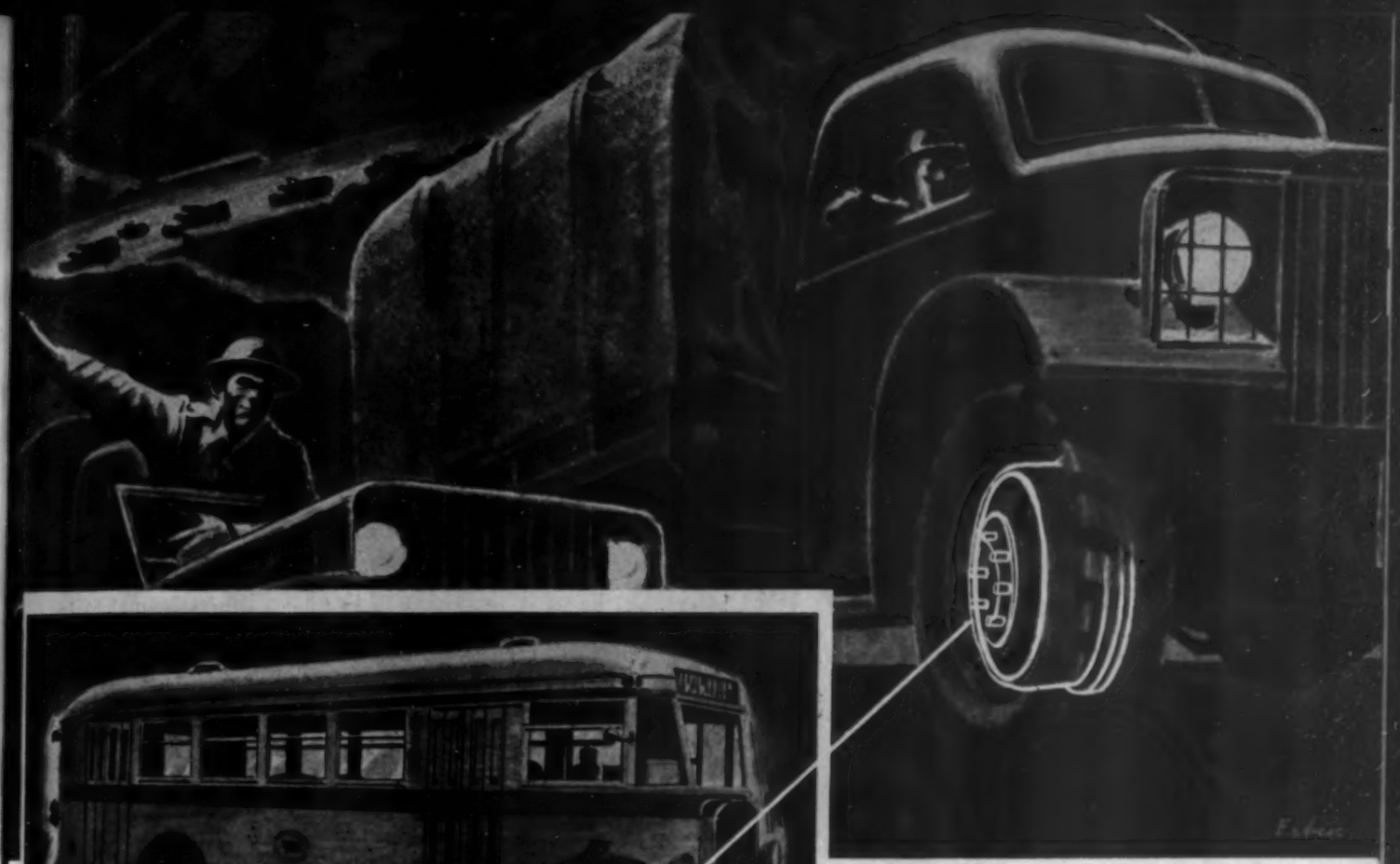


276,103 MILES ON ONE SET OF MOLYBDENUM-VANADIUM BRAKE DRUMS

One of the outstanding contributions to Wear and Heat Resistance in cast iron has been the development of various molybdenum-vanadium irons. Some of these irons have been in service for a number of years, and several long and remarkable performances are beginning to be written into the record.

One of these is the case of a set of brake drums installed on a Chicago & Calumet District Transit Company bus. These drums were applied on April 23, 1937 and were in service continuously for four years, finally being removed on May 2, 1941.

In this time, the bus had travelled 276,103 miles under conditions of heat and cold, road-shock and stopping, that are severe tests for any set of brake drums.

Under comparable conditions, unalloyed drums usually give an average of about 50,000 miles of service. Only in isolated cases is a life of 75,000 or 100,000 miles achieved.

The record-smashing molybdenum-vanadium drums were cast from iron of the composition shown below.

Total carbon	3.38%
Silicon	1.81
Manganese	0.71
Molybdenum	0.55
Vanadium	0.16

In this application, it may be pointed out that the vanadium, while distinctly a stable carbide forming element, here functions primarily as a toughening rather than a hardening agent. In all such applications, the proportion of vanadium relative to other components is determined by the combination of properties required—such as Strength and Wear Resistance, or Strength and Resistance to both Heat Shock and Wear.

The drums in this case were cast by Frank Foundries, of Moline, Illinois and supplied to the Chicago & Calumet District Transit Co. by Standard Spring Co. of Chicago.

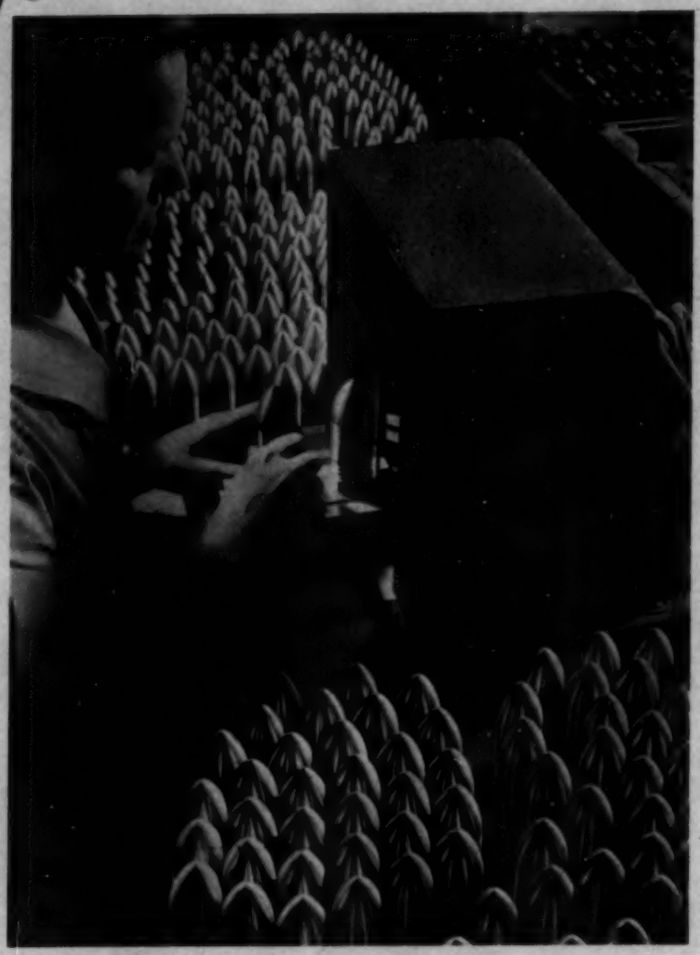
VANADIUM

CORPORATION OF AMERICA, NEW YORK, N.Y.

FERRO-ALLOYS

Drafting and Operating Under Government Contracts

(Section II)



Girl inspectors who formerly tested household electric appliances now turn deft fingers to similar tests in making munitions as refrigerator manufacture ends at a Westinghouse factory. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., photo

Computing the Fixed Fee: You must use foresight in computing the fixed fee. It is essential to compute accurately the cost of the work since the fee is fixed at an amount representing a percentage of this estimated cost. Be sure to consider all cost items peculiar to war work. An accurate estimate is also important because costs that run high above original estimates may create an atmosphere of suspicion. Then you would not only find your chances of getting future government contracts diminished, but you might find it difficult to collect even legitimate costs on the present contract.

In determining the fixed fee, one of the factors considered is investment turnover; that is, the average investment required to complete the order and a percentage on cost to allow a return on the stockholder's equity should be included. Consideration is also given to the extent to which the work is sublet, the amount of interest charges to be met out of the fixed fee allowance, and the reliability of the cost data available.

Cost-Plus Contracting Demands Good Cost Accounting: The need for an A-1 cost accounting system cannot be overemphasized. *Good cost accounting is a key to easy and profitable operation.* Navy regulations provide for inspection of your accounting system by the cost inspector to insure conformance to the requirements of the government Bureau of Supplies and Accounts.

The War Department similarly has established an Audit Control Section to examine your accounting practices and to require improved methods of cost accounting.

Recommendation: You should set up—with adequate professional help—a system of cost accounting to be followed under your contract. This system must be devised so as to give a clear picture of each cost factor to be charged to each of your government contracts. A good cost accounting system will more than pay for itself in avoiding annoyance, delay and uncertainty in getting reimbursements. Profitable operation is impossible without it. Items which would be reimbursed if supported by clear cost records may be denied if they cannot be tied down to the contract due to confused records.

You are under no obligation to modify a system of accounts so long as the records clearly show the actual cost on each contract. In many cases, it may be possible to meet the requirements of the cost inspectors of the Army and Navy without changing your bookkeeping methods. Supplementary schedules on work sheets reconciled to the account books and made a part of the permanent accounting records make your present accounting system adequate to meet cost inspectors' requirements and give a detailed picture of the contract cost.

In the determination of costs, direct labor and direct material expenses are easily ascertainable. You run into difficulties when you come to the indirect charges such as overhead and depreciation. In order to assist you in readjusting your accounting practices, the more pe-

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This is Section II of a series of three articles from *Producing for War*, published by the Research Institute of America, 292 Madison avenue, New York. This booklet, incidentally, contains much other vital information that everyone concerned with war production should have available. For Section I of this series, see STEEL, June 8, p. 76.

LOOK at this picture. The Northwest handles frames right to the second floor deck. No lost time! No trucking! Freight elevators aren't jammed up! Unused parts of old plants turned to more production! Time saved! The war effort helped!

Northwest Crawler Cranes are the easy solution to speed ups like this. Remember, they go anywhere without costly overhead structures or trackage. They handle any kind of load. They pile high or low. They load or unload trucks or cars, and they can speed up odd construction jobs or alterations around the plant.

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Use SW for thin sheet metal welding. A general-purpose all position electrode for a-c or d-c current.

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AP Electrodes are available in diameters ranging from $\frac{3}{32}$" to $\frac{5}{16}$". Try AP yourself and be convinced of its performance. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

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culiar and elusive items and problems connected with cost-plus contracting are here analyzed.

Non-Reimbursable Items: The contract is drawn to exclude expenses not properly chargeable to the government product. Chief of these is a considerable group of charges such as advertising, bad debts, discounts, commissions, etc., in general to be described as selling expenses. Another group of charges embraces those which some manufacturers customarily include in overhead but which are in reality proper charges to capital account, such as extraordinary repairs to buildings, etc., or proper charges to profit and loss or surplus account, such as interest, income and profits taxes, losses on contracts, excessive salaries, etc.

While these costs are not reimbursable, your cost accounting system should show them since they will come out of your fixed fee. Unless you set up your books to show such items you may later find that you incurred a concealed loss on your cost-plus contracts.

Overhead Items: To finance work during progress, a rate for overhead is tentatively fixed in advance based on definite representations of the contractor as to actual overhead for previous periods. The agreed rate is subject to revision as the work progresses. No general rule is applicable to this type of cost. You must break down your costs carefully and obtain definite written commitments from the government during negotiation. Where you produce partly for the government and partly for civilian consumption, be sure that your books properly allocate your overhead between your war and civilian contracts.

In approaching overhead costs between war and civilian contracts, an error is very often made which results in the civilian contract's bearing a disproportionate amount of the cost. But much of the overhead may be due to additional paper work and supervision attendant upon the closer tolerances and greater precision demanded on government work. Much may be due to the production speed up demanded by the government with attendant increased depreciation and industrial waste.

Depreciation for previous years when production was solely civilian should therefore be considered. Suppose in the preceding year you did $750,000 of civilian business with an overhead of $75,000 or 10 per cent. In this event you should not charge your civilian contracts 25 per cent and the war contracts 75 per cent. You should properly fix the amount chargeable to civilian output on the basis of your normal overhead ratio, which would in such case probably be much closer to 10 than 25 per cent.

Central office overhead, membership in trade and charitable organizations, annual and sick leave, vacation pay, increases in salaries and executive salaries are stumbling blocks. The reimbursability of these items varies with the department, the particular contract and facts presented.

Extraordinary Expenses: Be sure that your accounting system shows all extraordinary expenses in detail. For example, many contracts provide that the actual net cost of any recoveries due to accident or damages to persons or property not due to gross negligence may be included as cost. Likewise, loss or damage to your equipment, buildings, etc., occasioned by your employes or those of the government may or may not be reimbursable depending upon the contract and the circumstances surrounding the loss.

Overtime Wage Costs: Overtime wage costs are expressly reimbursable under Navy regulations. Accounting practices with respect to overtime vary according to the nature of the work. Since today it is very likely that all the jobs in a plant may be "rush jobs", it is difficult to allocate overtime costs directly to a specific job on which the overtime is expended. Have a system by which you can show exactly where overtime is expended and try to allocate it evenly among the various rush jobs. Try to assign separate crews to the government work.

Incidental Costs Connected with Employment: Incentive bonuses, accident compensation and contributions to voluntary retirement funds may be included as costs. Contributions to a voluntary retirement fund must be actual, as distinguished from mere book entries as an accrued liability. If the retirement plan is discontinued by an employe so that the employer recovers the money he paid into the plan, he must refund to the government the amount for which reimbursement had previously been received from the government.

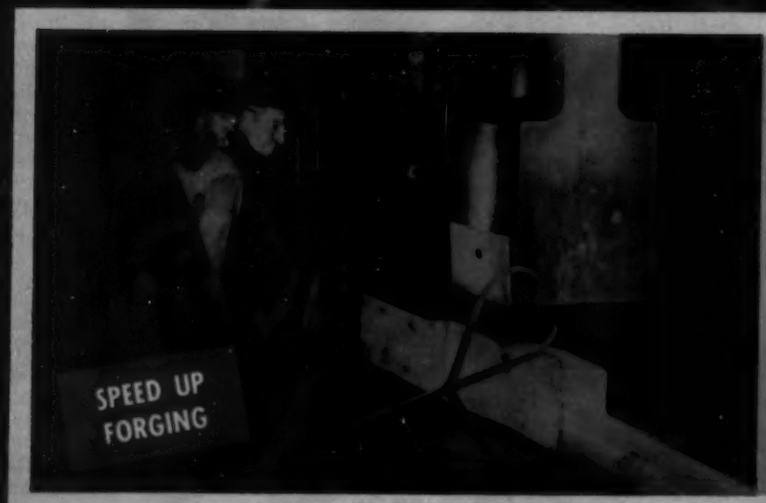
The cost to the contractor of employes' welfare expenses, hospitals, canteens and amusement facilities are also reimbursable costs. Under the cost-plus-fixed-fee construction contract, however, all commissaries must be operated as nearly as possible without profit or loss. So, too, reasonable amounts paid to banks as activity charges for cashing checks without cost to the employe are reimbursable. Labor hiring costs such as payments to "labor scouts" have been held to be allowable. Contracts, furthermore, often provide for reimbursement of the cost of transporting workers and travel expenses of field forces and officers. Traveling expenses of prospective employes to the contractor's place of business for interviews has been held to be reimbursable under a properly drawn clause of this type. Similarly, the living expenses of employes at the site of the work prior to the arrival of their families, the travel expenses of the employes in returning to their homes for their families and household effects, and the expenses incurred in moving the employe's family and household goods, have been held to be reimbursable. If the contract contains an adequate provision, even traveling expenses incurred prior to the signing of the contract may be reimbursed if expended in connection with the performance of the work.

Material Costs: The cost of materials which become a component part of the finished product or which are used directly in fabricating, converting or processing this material or parts is reimbursable. Note that this includes incidental materials and supplies necessary for the operation of the plant such as shop fuel; lubricants; heat treating, plating, cleaning and anodyzing supplies; non-durable tools and gages; stationary; boxing and wrapping materials. Other allowable material costs are supplies for the engineering department such as paper and ink for drafting. Contracts often provide that the contractor shall be reimbursed for purchasing, inspecting, storing, transporting, insuring, salvaging and other usual expenses incident to the procurement and use of materials if authorized by the contracting officer. Set up your books and vouchers so as to segregate all such costs which are properly chargeable to the contract.

Note, prices in excess of those fixed by law or by price schedules are not allowed. All government purchasing agencies have been directed to abide by maximum prices fixed by the Office of Price Administration. Contracting officers have been instructed that no item may be approved for reimbursement if you have paid prices higher than the set ceiling.

Recommendation: Familarize yourself well with price schedules and use care in purchasing materials, supplies, tools, machinery or equipment subject to a schedule so that the maximum price will not be exceeded. Watch closely since many such costs may be included in larger items without breakdown. In order to have a positive check on the item, set up your books so as to show not only the price paid but also the price ceiling on the date of the sale. This will prevent delay in reimbursement. Note that expenditures in excess of the maximum prices are reimbursable if prior authority for the expenditure

(*Please turn to Page* 108)



STEELS THAT MEET THE CHALLENGE OF TODAY AND TOMORROW

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Here's how these men can help you. In shop after shop, they have been in on the ground floor in the development of time-saving techniques in the application of steel for the essential weapons of war. Specialists in steel, these men can place at your disposal a wealth of practical experience that will help to speed up and simplify your shop fabricating and heat-treating procedures. Because they are constantly in touch with the latest findings of our research and metallurgical laboratories, they are competent to advise you what steels to use, when the usual steels—and other important metals—become scarce or unobtainable. What is more, they are prepared to show you how best to use the steels available, with the minimum of trouble, waste and delay.

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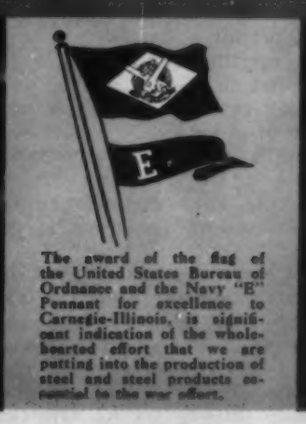


The award of the flag of the United States Bureau of Ordnance and the Navy "E" Pennant for excellence to Carnegie-Illinois, is significant indication of the wholehearted effort that we are putting into the production of steel and steel products essential to the war effort.

S T A T E S S T E E L

Fig. 1. (Above)—Once loaded and started, each of these power saws cut billets into desired lengths without attention. As soon as one cut is completed, the piece is discharged onto a conveyor and the billet moved into position against a stop ready for the next cut. This can be done automatically by means of a power takeup which operates the cable reel, winding in the cable attached to the far end of the billet as shown here

Fig. 2. (Left)—Closeup of billet saw. Note advancing billet pushes cut piece off onto conveyor

Conveyors Speed ....

BILLETS TO BULLETS

FIRST we see several gondola cars and a snorting locomotive moving along the spur-track entrance of a huge plant, where formerly production was concentrated on agricultural equipment. Then, as the engine speeds away with cars loaded with finished shell, a 40-ton crane with electric magnet begins relieving the newly arrived gondolas of their loads. With every lift of the magnet the springs under the cars slowly push their way back to normal length. The stock being unloaded from the gondolas is 20 feet long, 5½ inches square.

As we move into the plant, we see a battery of power saws, Fig. 1, busily chewing the steel with a silence, rhythm and speed that amazes the onlooker. The hydraulically controlled power saws perform and repeat their cycles with little attention—never tiring, never stopping, never resting. When the saws are equipped with hydraulically operated conveyors, the cycle continues around the clock with the aid of only the reload man. As the operation progresses, the cycle may be divided into six distinct parts:

1—The blade is lowered to and fed into the work under the correct hydraulic feed pressure.

2—At the conclusion of the cut the blade rises clear of the cut, double quick, to permit . . . .

3—The opening of the stock locking vise, and . . . .

4—A pull forward on the remaining piece of stock.

5—Length gaging is automatic, too.

6—Locking vises then are closed hydraulically, and the cycle is repeated.

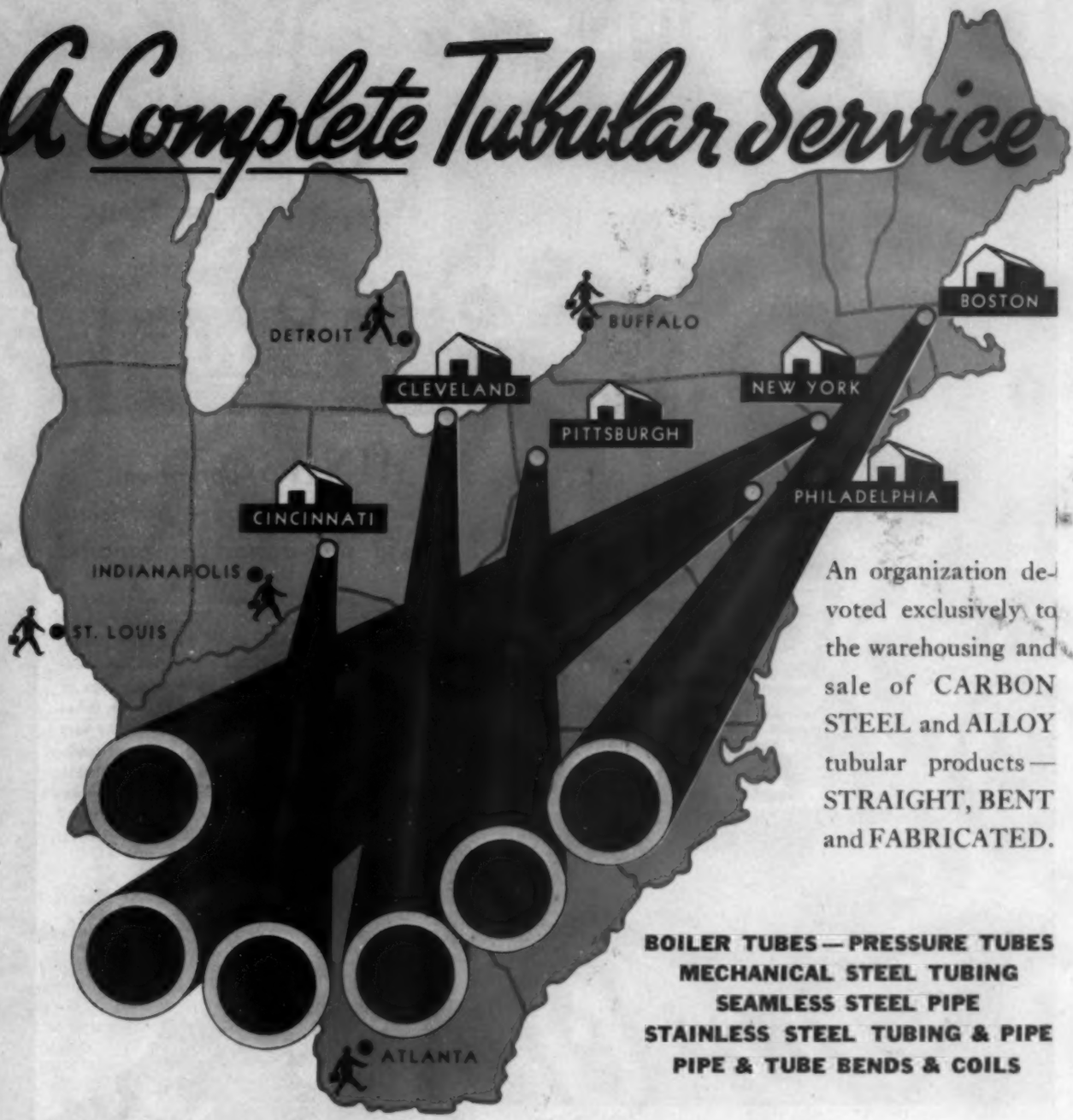
Sawing continues at the speed set on the dial indicator until the last remaining stub of material automatically stops the saw for reloading.

Hand-operated conveyors similar to the automatic conveyors also can be installed on plain type machines. Where hand operated conveyors are used, it is necessary for the operator to roll the stock forward at the completion of each cut.

The required length of the pieces for forging 155-millimeter shell bodies is 15 inches. It is important that the billets be cut to length accurately and absolutely square to avoid trouble at the forge. When the cherry-red billets are removed from the furnaces they must sit squarely on end, ready for drawing and piercing. Sawing cannot surface harden nor fracture the precious metal. The cool-cutting blade removes as little as 1/16-inch of fine steel chips, which are instantly washed away by the flood of coolant. The small amount of metal removed means less cutting time in the shell plant, less haul-back tonnage for the railroads, and less reroll time for the steel mills.

Billets move fast at the forge. As a red-hot billet is lifted out, another squarely cut 15 x 5½ x 5½-inch piece is dropped into the gas-and-oil-fired rotary furnace to start its heating cycle. The heated billet is dropped nose downward into a 1000-ton hydraulic piercing punch press. In 2½ seconds the billet is drawn to a length of 29½ inches and to a diameter of 6¼ inches. A 300-ton hydraulic ram ejects the shell forging, which is now sent to other presses for finish forging operations and then is set aside to cool.

A Complete Tubular Service



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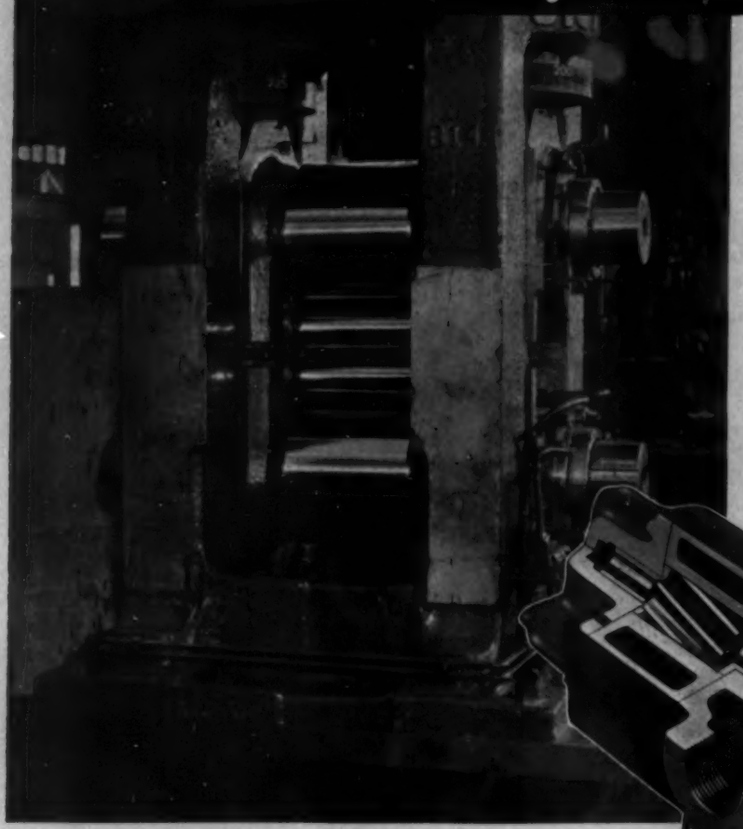
PLUS *absolute control, highest efficiency, and unfailing reliability.*

ROPER *Rotary* PUMPS



MINUS *operation worry, large space provision and shut-downs for repairs.*

The arrow on the large illustration points to a small, compact ROPER lubrication pump; below is a cut-away view. This little pump, operated by direct motor connection, takes excellent care of the lubrication at the tops of screw downs. Like all ROPER PUMPS, it has but two moving parts, yet it produces the very maximum in mechanical and volumetric efficiency. Hydraulically balanced, easy to install, quiet in operation and built for long, trouble-free life, ROPER PUMPS are the result of 85 years of engineering and building experience.

We suggest that you write for catalog 948; it contains a summary and a digest of solid information concerning pumps and pumping problems. Your copy will be mailed promptly upon request.

HYDRAULICALLY BALANCED

THIS SEAL APPEARS ON EVERY ROPER "HYDRAULICALLY BALANCED" PUMP. IT MEANS HIGHER EFFICIENCY, QUIETER OPERATION, GREATER DEPENDABILITY AND LONGER LIFE.

GEO. D. ROPER CORP.

ROCKFORD, ILLINOIS

PITTSBURGH OFFICE: 207-209 BLVD. OF THE ALLIES

DEPENDABLE HYDRAULIC POWER ENGINEERED TO YOUR REQUIREMENTS

Fig. 3. (Left, above)—Gravity roller conveyors take work to and away from this saw used to cut off the butt ends

Fig. 4. (Right, above)—Closeup of entrance side of trimming saw which removes butt ends in pairs as the double row of shell bodies passes under the saw blade. Note air clamping device seen here and in Fig. 3. Peerless Mfg. Co. photos

Later it is conveyed to the machine shop where it is turned to size.

After the shell forgings have been rough turned in the machine shop, they may have their nose end reheated for "nosing", or the operation may be done cold. Then they are placed in double-line formation on a conveyor and sent through a saw for the final butt-end cut. A 14-inch Peerless high-duty saw, Figs. 3 and 4, is used for this purpose. The air-operated holding vise securely locks the shell bodies in place while the 2-inch butt-ends are removed. A 4-point 0.072 x 1.5-inch high-speed blade is used. Between 2000 and 3000 square inches are cut with a single blade when the best coolants are used. Note 48 cuts have already been chalked up for the blade in Fig. 4. The saw is operated at high speed—125 strokes per minute. Low and intermediate speeds, 50 and 85 strokes per minute, can be engaged instantly as conditions require.

After the butt-end cut has been made, the shell bodies are weighed as a final check on their uniformity before they are released for filling.

Every operation from "billets to bullets" is handled with the utmost speed by means of gravity and powered conveyor lines. The type of shell described here is projected from a husky short-barrelled gun, commonly called a mortar. The fact that a single gun can project shell faster than a full factory shift can produce them is a challenge to American industry as well as the back-home worker who is determined to "keep 'em shootin'."

Two Million Documents Recorded on Microfilm

Through use of microfilming equipment, a story of the electrical industry's growth since the early 1880's is being transferred from two million sheets of old Irish linen and drawing paper to movie film at the Westinghouse East Pittsburgh works.

As a result, an acre of storage space will be cleared for productive use and a more efficient record system set up by reducing the size of "tons of permanent records". When recorded on film, documents which now occupy this acre in floor space can be stored in a vault about 10 feet square, according to the company.

More than two million of these documents will be photographed during this 2-year project. To be put on 16-millimeter or 35-millimeter movie film, depending on size, are records ranging from 5-inch cards to 5-foot drawings.

Records of typing paper size or smaller are fed into an automatic camera machine which snaps the picture at an average rate of 35 per minute. Ledger sheets, engineering drawings and tracings are photographed by a 35-millimeter camera suspended above a table.

Old shop orders, sketches, drawings and charts which have accumulated from the time the company was organized 56 years ago are all being photographed.

The saving in sheet steel required for filing cabinets marks another step in the company's effort to conserve important metals for the war effort. Each year 25 steel filing cabinets were installed for the tracings of engineering drawings alone. These and similar bulky cabinets now occupy an estimated 50,000 square feet of floor area.

Previously two steel filing cabinets were required to hold 2700 shop orders. When recorded on 16-millimeter film, these same orders will fill just one film roll of 100 feet which fits into a box about as large as two cigaret packages.

New Foster Book Deals With Superfinishing

International Machine Tool Corp., Foster Division, Elkhart, Ind., recently published a working manual *Cylindrical Superfinishing*—a 140-page, 6 x 9-inch book, which covers thoroughly both theory and practice of superfinishing cylindrical surfaces in connection with production.

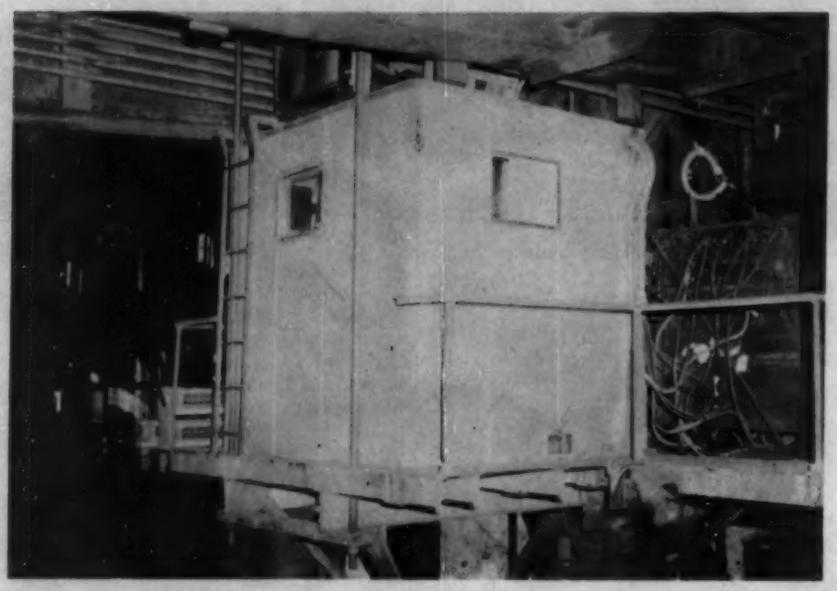
The first part of the book is devoted to theoretical considerations, use of profilometers and surface analysers, and desirable effects of superfinishing on bearings, clutch and brake behavior and durability.

The balance of the book—and the major part—deals with superfinishing as a modern machine shop method. Choice, preparation and lubrication of the abrasive stones are dealt with; definite speeds and feeds for various jobs are recommended; and a large number of effective setups are described and illustrated. Standard machines and attachments also are illustrated and described.

A limited number of copies of this book are available to accredited tooling and production engineers who are concerned with superfinishing such war material components as gun recoil pistons; slides of gun mounts; airplane motor; navigation instrument and fire control apparatus parts; and antifriction bearings.

AIR CONDITIONED CRANE CABS

Temperature in operator's compartment, which formerly averaged 165 degrees Fahr. necessitated a crane crew of three men each working 20-minute periods. With an air conditioned cab one operator works his 8-hour turn continuously. Communication with the ground crew is by means of a 2-way radio



Air conditioned cab on pit crane. Communication between operator and ground crew is by radio

TWO OPERATOR cabs on the cranes which serve the soaking pit department of an alloy steelmaker recently have been air conditioned. With the conventional type cab, a workman could not work longer than 20 minutes in the heat which, at times, reaches nearly 200 degrees Fahr. The average temperature of the air above the pits, however, is about 165 degrees Fahr. Since the new, totally enclosed air conditioned cabs have been installed, one operator is now able to work the full 8-hour shift. In fact, some of the operators eat their lunches in the cabs since they are more comfortable there than anywhere else around the plant. Formerly, three operators were required on each shift, each man working 20 minutes of each hour.

While cooled crane cabs give the company a tremendous saving in labor costs—enough to pay the cost in less than a year—the installation was not made for that purpose alone. There is a shortage of skilled crane operators and as each operator is three times as productive as formerly, the war production program is aided. Also, the discomfort and unhealthy condition encountered in such a high temperature has been obviated.

At the time the cooling system was designed, no similar job had been installed where the ambient temperature averaged over 125 degrees Fahr.—as far as known. However, there had been a few installations prior to this one, but at lower temperatures. Air conditioning equipment was designed to produce an inside condition of 105 degrees, that is, a 60-degree temperature difference. In actual operation, the temperature in the cabs is maintained at 95 degrees Fahr. or lower, which seems to be necessary to keep the operators comfortable. Most of the time the cab temperature averages about 85 degrees.

Before the cabs could be conditioned it was necessary to enclose them. Formerly they were open so that the operators could get as much ventilation as possible. As it was not practical to enclose the old cabs, new ones were built. The new ones are 7 x 7 x 7 feet, all surfaces being thoroughly insulated. Floors are insulated with 4-inch rock cork and the other surfaces with 2 inches. The outsides of the cabs were painted aluminum to reduce the radiant heat from the soaking pits. Windows, 22 x 16 inches, were provided, and there is a glass covered observation hole in the floor of the cab approximately the same size as the windows.

Enclosure of the cabs brought up another problem—satisfactory communication from operator to ground crew. Hand signals had been used, but it was found necessary to install 2-way radio communication. This was done by the steel mill, and solved the communication problem.

One stipulation which the owners insisted upon—and which, at first, made the job seem almost impossible—was that no water be used in connection with the cooling equipment. It was impractical to use water for condensing purposes for the refrigerating machine, as the crane with a span of 100 feet operates over a runway of approximately 600 feet. This meant that an air-cooled condensing unit had to be used, and it can readily be appreciated what a problem this presented, using 165 degrees Fahr. air for the condensing medium.

No exact data on the operation of condensing units were available at such a high condensing temperature. In actual operation, it was found that the condensing pressure averages about 250 pounds per square inch gage.

The uncertainty of the head pressure made it difficult to determine the size of the compressor motor required. A 2-horsepower motor was used, but at the start-up of the system it was found that this motor was slightly overloaded and hence there was added an auxiliary condenser (with a propeller fan for ventilation) which lowered the condensing pressure to about 250 pounds and made the 2-horsepower motor ample in capacity.

Practically every item in this system was specially built because of the high temperature. A special built-up air conditioning unit, approximately 54 inches long, 18 inches wide and 54 inches high, was placed inside each cab alongside one wall with the small air intake through the wall. The unit is

(*Please turn to Page* 113)

By HENRY W. MOORE

Manager, Air Conditioning Engineering Department
Bimel Co.,
Cincinnati

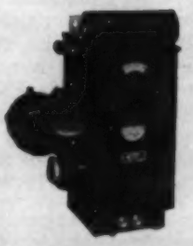
From an article in the February issue of *Heating, Piping & Air Conditioning.*

A BETTER WAY TO "Put the Heat On" PRODUCTION!

Wartime's tighter heat-treating specifications coupled with the present scarcity of experienced operators, make it doubly tough to get out big-scale production today. That's why so many of the leading war industries now insist on getting the three-way production help that Foxboro Potentiometer Instruments provide by . . .

(1) Holding temperature variations within closer limits, (2) enabling quicker, more-exact operation by "green" workers, (3) practically eliminating shut-downs for instrument servicing.

Foxboro Potentiometer Controllers



- Fixed slide-wire contact provides knife-edge detection of the highest sensitivity.
- Super-size temperature dial, 12 inches in circumference, permits easy settings to within 1% of scale-range.
- Large trouble-proof parts prevent wear and lost motion . . . never require replacements.
- Exclusive multiple-drive feature enables use of single motor for up to 8 instruments.

Foxboro Potentiometer Recorders

- Unique balancing mechanism gives quicker, more exact response . . . surer guidance to operators.
- Practically unbreakable galvanometer suspensions save shut-downs and maintenance time.
- Integral mounting of slide-wire contacts and pen eliminates gear-train complications.
- Ball-bearings at every important bearing point insure sustained accuracy and sensitivity.

WRITE FOR COMPLETE DETAILS *of these more-dependable pyrometers in Bulletin 202-3 and Bulletin 190-S.* **The Foxboro Company, 118 Neponset Ave., Foxboro, Mass., U. S. A.** *Branches in principal cities.*

RECORDING • CONTROLLING • INDICATING — FOXBORO

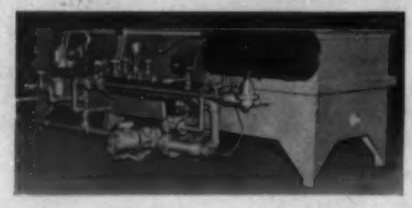
Reg. U. S. Pat. Off.

Potentiometer Instruments

INDUSTRIAL EQUIPMENT

Wash Tanks

Bell & Gossett Co., Morton Grove, Ill., announces a line of wash tanks to meet specialized requirements. The illustration shows one of these—a 3-compartment tank, especially designed for washing



castings. Castings are successively passed through cold kerosene, hot Oakite and finally hot water. The two hot baths are maintained at the proper temperature by water heated in a steam converter and mechanically circulated through coils in the tanks. Operation of the tanks and control of temperature is entirely automatic.

Improved Miller

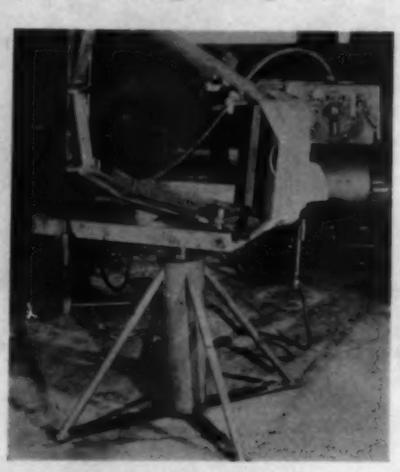
Blank & Buxton Machinery Co., Jackson, Mich., announces improved vernier mountings on its swiveling-head vertical milling machines. Previously, these scales and verniers were located in a vertical plane. This required stooping on the part of the operator when readings were being made.

Under the new arrangement, shown in the lower portion of the accompanying illustration, scales and verniers are mounted on an angle which enables them to be read from normal operating position. Furthermore, the cross vernier has been moved from the front of the knee to a more accessible location toward the back. In this illustration, the table is equipped with power feed mechanism. The machines are furnished either with or without this feature—depending on the nature of the work.

Another new feature now available as an extra on these machines is power feed to spindle. The manner in which this device is mounted on the head, driven from the main drive pulley of the spindle and geared to the cross shaft which feeds the spindle quill are depicted in the upper portion of the accompanying illustration. This feature is especially useful when the machine is employed on precision boring operations.

Elevating Welding Table

Lyon-Raymond Corp., 955 Madison street, Greene, N. Y., announces a new elevating welding table with



revolving top which enables the operator to keep the work at the most convenient welding heights by means of a foot-operated hydraulic pump. While not exactly a welding positioner, the equipment does serve this purpose in many instances. The standard stock size table has a capacity of 2000 pounds. Its platform size is 30 x 30 inches, lowered height is 26 inches, elevated height 40 inches and elevation 14 inches. The table is portable although it is mounted on a floor base rather than on casters.

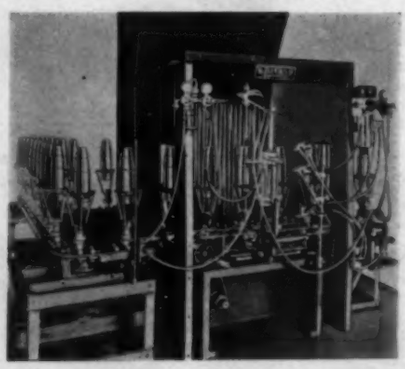
Flame Arrestor

Johnston & Jennings Co., 877 Addison road, Cleveland, has introduced an improved model of its Oceco flame arrestor for lines carrying explosive gases in steel mills. It consists of a strong, rigid housing

with cover and the all-aluminum flame arrestor element. The housing is of cast semisteel capable of withstanding direct exposure to heat and flame for long periods. The arrestor element consists of alternate flat and corrugated sheets of pure aluminum to resist corrosion. This construction results in vertical straight through passages, minimizing tendency to retain moisture and foreign materials and offering minimum resistance to gas flow. The arrestor element is inspected easily by unloosening the four hand wheels on the cover, pulling out the element on its slide rails, and looking through the straight passages. The equipment is available in 2, 3, 4, 6, 8 and 10-inch sizes.

Shell Coating Machine

Binks Mfg. Co., 3114 Carroll avenue, Chicago, announces an automatic shell coating machine for spraying the inside and outside of 75 to 105 millimeter shell. It is reported to handle several hundred shell per minute. The shell are loaded on a moving conveyor, also part of the machine, in a specially designed workholder, which holds them in place. As these pass in front of



---so AERO GEARS, too are now SHAVED* ------

Since the advertisement at left appeared in 1940, there has been widespread adoption of the "Michigan" crossed-axis shaving process for finishing aircraft gears to multiply output and cut costs—while IMPROVING QUALITY.

Saves 4/5 of the time

Saves 5/6 of the equipment cost

Saves 7/8 of the tool cost

*Most, but not all aircraft gear designs lend themselves to finishing by shaving. We will be glad to advise you whether or not your gear designs permit the use of the "Michigan" gear finishing process.

There are several types of finishers to choose from—rotary and rack—external and internal—for large gears and small gears.

A battery of "Michigan" rotaries finishing gears in the plant of one aero engine producer.

MICHIGAN TOOL COMPANY

7171 E. McNichols Road • Detroit, U. S. A.

GLASS

HANDLE WITH CARE ...OR ELSE!

AND HERE'S WHY! It's glass for safety devices that protect workers from blinding chips of metal, flying sparks and gas fumes. It's glass for the goggles and gas masks that keep men on the job—fighting the TOTAL WAR for production.

Of course, all Reading Electric Hoists are not given dramatic jobs like this. But no matter what the job turned over to your Reading Electric Hoist, it will be done well and without fail.

"No parts replaced in three years." and "It just needs an occasional oiling." are typical remarks from users who have found that it pays to *standardize* on Reading Electric Hoists—whatever the capacity requirements from ½-ton to 2 tons. When *results* and *savings* are in your specifications, rely on Reading's engineering ability.

TO HELP YOU solve your materials handling problems we have issued a handy booklet, "144 Answers to Your Hoisting Problems". A copy is yours for the asking.

READING CHAIN & BLOCK CORP.
DEPT. B-6 READING, PA.

READING
Chain Hoists, Electric Hoists, Cranes and Monorails

the water wash spray booth, an oscillating mechanism engages the spindle of the work holder, rotating the shell in front of the automatic spray guns, which spray the exteriors. The shell then pass, still rotating, to the position where a pneumatic spray gun plunges down into the interior cavity of the shell as it rotates, completely spraying the inside. The shell next pass away from the oscillating mechanism, and continue on the conveyor for required time to complete an air dry. Feature of the machine is a device known as a "skip spray" unit. This is so designed that should a shell be missing on the conveyor, the gun will not spray. Thus no paint is wasted or lost.

Electric Tire Brander

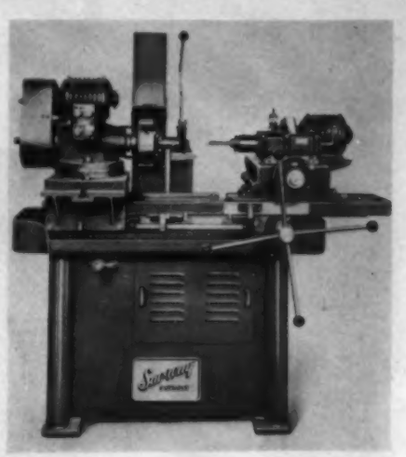
Master Mfg. Co., 1400 West Fulton street, Chicago, has placed on the market a Master electric tire

brander especially designed for use by organizations utilizing fleets of trucks and automobiles. It is said to safeguard tires against theft. The electric torch or brander is available in three models—Master No. 1, No. 2 and No. 30. The first is a light-duty torch while the other two can be used on heavy fleet trucks.

Besides ordinary branding operations, the No. 30, a rotary unit, also can be used to record mileage.

Internal Grinder

Sav-Way Tool & Machining Co., 13835 Joseph Campau avenue, Detroit, announces an internal precision grinder that grinds holes up to 9 inches deep and from ¼ to 18 inches in diameter, straight or tapered sides. It is said to be suitable for both tool room and production grinding. Construction of the grinder headstock is such that loosening of two nuts permits an adjustment to a distance of 3½ inches at right angles to the wheel traverse. This allows grinding of angles. Variable V-belt pulleys provide four variations of work head speed. The grinding wheel head may be adjusted to 0.0001-inch. Diamond holder is of the swing type with micrometer adjustment, enabling operator to set diamond accurately for sizing holes. Machine is equipped with automatic wheel guard. Motors, bearings, coolant pump, electric controls and grinding spindle are standard makes.



Speed Calculator

Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, announces it is equipping its dial type milling machines with a new built-in milling speed calculator to enable the operator to select the correct spindle speed for any combination of work and tool materials and cutter diameter, without guess work or paper work. The calculator, as shown in the illustration, is, in effect, a circular slide rule. It consists of a stationary disk and two rotatable disks, with a semicircular cover plate in which are two windows. On the periphery of the stationary disk are scaled various cutting speeds from 20 to 4000 feet per minute. On the top of the larger movable disk, cutter diameters are given, while at the bottom cutter

revolutions per minute appear. Use of the calculator makes knowledge of mathematics on the part of the operator unnecessary.

NEW HORIZONS

FORWARD-LOOKING manufacturers, because of thorough research and experience in their particular fields, can aid in establishing a better social and economic order in more ways than by providing machinery and merchandise. That is why Continental Machines, Inc. deal out fresh ideas and usable information every little while.

MACHINES CREATE EMPLOYMENT

During the gray days of the past decade, many people believed that machines were one of the chief causes of unemployment. In 1939 Continental published "Machines and Progress", a panoramic wall chart 5 feet long and 2 feet high, matching mechanical development through the years with employment figures. This study shows that machines are in reality the stepladders to higher standards of living. There are still a few of these charts on hand, if you'd like to have one.

STIMULATING YOUNG MEN'S INTEREST

Before there was too great a scarcity of mechanics and tool makers, Continental made a bold bid to young men everywhere to swap their frayed white collars for honest, money-making overalls. They published "12 Easy Lessons In Machine Shop Practice". This illustrated study course was distributed to schools, Y.M.C.-A.'s, Boys Clubs, and hung in factories from coast to coast. It became so popular that it had to be reprinted this year. Would you like a copy?

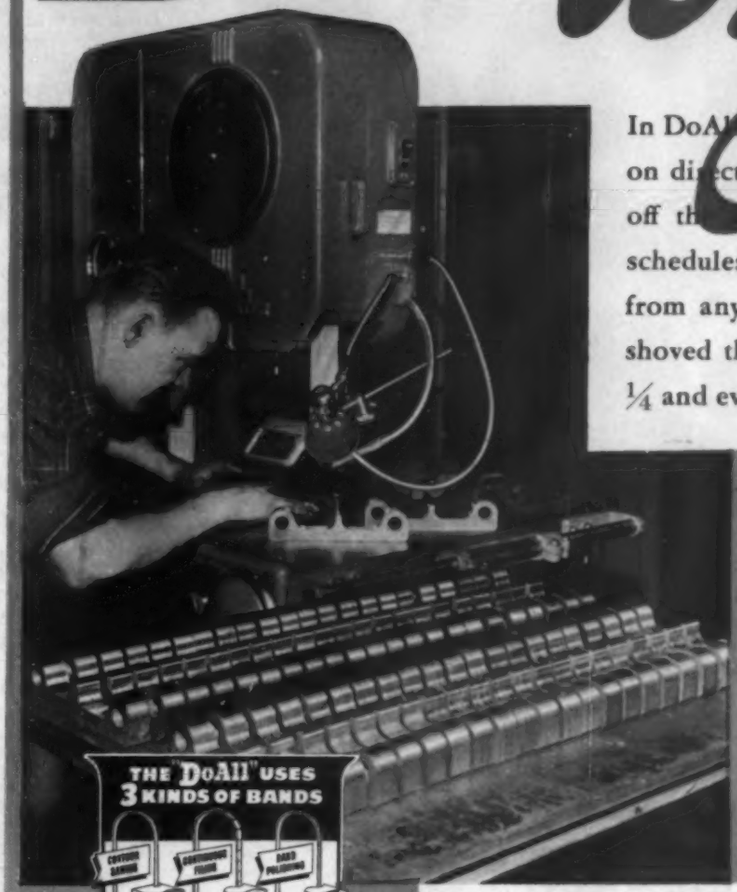
FREE TRAINING COURSES

The DoAll Trade School, Minneapolis, gives *Free* training in the use of DoAll Contour Machines, Surface Grinders, Lathes, Shapers, Milling Machines, etc. Into a short course are packed 200 to 500 hours of actual shop work, lectures, movies, experiments with new metals, etc. Sixty students are graduated and placed in industry every month. If you know a young man who wants to learn how to do a multitude of jobs faster and better, send for application blank. Or, it may be that you can use one of the School's graduates in your plant.

CUTTING COSTS

A brand new book of few words and loads of illustrations, prepared in a snappy, Chalk Talk style that won't let you put it down until you reach Page 48 and the last one of the "40 Ways To Cut Machining Costs." Let us send you a copy.

DoAll PRODUCTION Wizard



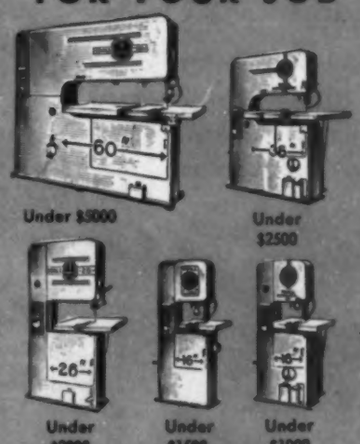
In DoAll equipped plants, war orders on direct or sub contract are coming off the assembly lines far ahead of schedules. Products or parts made from any kind of metal or alloy are shoved through to completion in ½, ¼ and even ⅛ former time.

Left—Production work on Swedish steel 1" thick. A much improved and faster method over shaping or milling.

Right—Internal finishing of large brass collector rings.

Steel alloy aircraft tubing cutoff production for airplane motor mounting frame work. New war-time job for this firm.

THE EXACT SIZE FOR YOUR JOB



All Models with Motors

DoAll Aim

To shorten the war and get back to peace-time work on everything American from automobiles to lawn sprinklers.

DoAlls offer the fastest precision method to remove metal. They relieve $5,000 to $50,000 machine tools of over-load work and have become absolute *musts* in every modern plant.

BETTER INVESTIGATE

Let us send a factory-trained production man to your plant with a DoAll to show you how it can short-cut your orders to completion.

CONTINENTAL MACHINES, INC.

1324 S. Washington Ave., Minneapolis, Minn.

Associated with the DoAll Company, Des Plaines, Ill.
Manufacturers of Band Saws and Band Files for DoAll Contour Machines.

NEW BOOK

"DoAll on Production"—40 pictures of DoAlls at work all over the country. Prepared for quick reading by busy men. Send for copy.

Forgings by Standard
are **RIGHT**

Since 1795 Standard has maintained a reputation for quality forgings. Standard products have continually met the service requirements of industry by rigid control of every step in the manufacturing process from open hearth to finished forging. Customers' specifications have been fulfilled and customer satisfaction has increased.

Today Standard is serving the nation to the utmost, with highest quality constantly maintained. The materials going into Standard products are carefully analyzed by expert metallurgists and chemists using the most modern testing equipment. Trained personnel and large shop facilities guarantee dependable product performance.

For users of forgings, this product superiority means extended service life, and a large contribution toward reduction in operating costs.

FORGINGS • CASTINGS • WELDLESS RINGS • STEEL WHEELS

STANDARD
STEEL WORKS
DIVISION OF
THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA

Government Contracts

(*Continued from Page* 95)

is received from the secretary of war—but consent in advance will be given only in extreme cases.

Insurance and Bonds: It is usual to provide specifically for the actual net cost of insurance and bonds as a reimbursable item. Many contracts provide that premiums on bonds and insurance policies required by the contracting officer for the *protection of the government* shall be included as cost, together with the cost of all public liability, employers' liability. Workmen's compensation, fidelity, fire, theft, burglary and other insurance the contracting officer may approve as reasonably necessary for the protection of the contractor. According to T. D. 5000 insurance in connection with experimental undertakings or development risks such as crash insurance are allowable, but life insurance on company officials is not.

If you assume your own insurable risks for (a) workmen's compensation or (b) unemployment risks in the state where insurance is required, a reasonable portion of the charges set up under your regularly employed accounting system may be allowed, provided they do not exceed the rates of regular insurance companies. This allowance must be reduced by amounts representing the acquisition cost incurred by insurance companies, and you must adopt and consistently follow self-insurance in connection with all contracts and subcontracts subsequently performed by you. In other cases of self-insurance, losses and payments will be allowed only to the extent of the actual losses suffered or payments incurred during and in the course of performance of the contract or subcontract according to T. D. 5000. Note, however, that the contracting officers may not consent to self-insurance. *Go into the question at the time the contract is drafted.*

The government will require that you obtain your insurance at the lowest rate possible. You will usually be required to procure it either on a competitive bid basis or under the War Department Insurance Rating Plan. Generally speaking, under that plan the contractor can select any insurer who will, in turn, be reimbursed for any loss suffered and be paid in addition a fixed fee representing compensation for the insurer's administrative services.

Reimbursement for Use of Contractor's Equipment: The old Equipment Rental Schedule used in computing rentals on contractor-owned construction plants has been superseded. Since Sept. 15, 1941, these rental rates have been computed according to the formula and directions contained in the new schedule,

"Uniform Rates for Contractor Owned Equipment."

Under the new method, the monthly rental is computed by multiplying the assigned value of the equipment by the depreciation factor plus 0.025, and then dividing by 12. The depreciation factor is expressed in the following fraction: 1 divided by the assigned service life in years less the age in years at the time of acceptance. (The assigned service life for each piece of equipment is established by the "List of Assigned Service Life Factors for Selected Items of Construction Plant in Continuous Rental Status" published by the War Department on Aug. 27, 1941.) The monthly rental must therefore grow less in direct proportion to the increase in age.

In cases where actual age exceeds the assigned service life, it is assumed that the construction plant is in its final year of assigned service life. This may result in injustice. Old equipment which has been kept in good repair may produce as much and operate as efficiently as new equipment; nevertheless, the contractor with old equipment receives less rental merely because the equipment is old. The investment and expense attached to the regular overhauling of the old machinery to keep it in A-1 shape is ignored. The contractor who has spent money over the years to repair, conserve and extend the useful life of his old equipment is therefore penalized, while the one who buys new machinery spends nothing on its repair and trades it in for new equipment when trouble develops, receives the greatest reward.

Major and minor repairs, including repair parts, constitute reimbursable items, but you should get the contracting officer's prior approval.

Profit, interest on capital investment and overhead items, including storage, are contained in the fixed fee and are non-reimbursable. Taxes are also non-reimbursable.

Equipment Rented from Third Parties: Rental rates for equipment are normally considered to include an allowance for wear and tear incident to use. This does not apply, however, where your equipment rental agreement provides otherwise. You may be reimbursed for those repair expenses which constitutes routine maintenance and normal running repairs. Before approving or ratifying the expenditure for reimbursement, however, the contracting officer will consider whether the responsibility is yours or the lessor's under the rental agreement.

Tax Items: Income and excess profits taxes are *not allowed* as cost. State and federal excise taxes

"LIKE CUTTING THROUGH BUTTER ... PHILLIPS SCREWS TAKE THE HARD WORK OUT OF FASTENING"
BUTTER
"AND DON'T FORGET! PHILLIPS SCREWS COST LESS TO USE"

Easier Screwdriving • Freedom from Accidents • Tighter Seating = 50% Less Assembly Cost with Phillips Screws

You'd know the difference if you were doing the job. In fact, executives who have their own home workshops are usually the quickest to see the advantages of the Phillips principle and adopt it for their firm's assembly work.

It really *is* easy to drive Phillips Recessed Head Screws. You get a better "grab" on the screw because the driver point and Phillips recess make a snug fit. There's no danger of the driver slipping, so you don't have to spend a good part of your effort holding it in — you just keep *turning*. And there are more jobs on which you can use power drivers.

Translate this *ease of driving* into time and then time into dollars. An operator can, on the average, cut fastening time *in half*. Figure it out for yourself — then add the savings you get from using fewer screws (better holding power often reduces number or size of screws needed), spoiling fewer screws (no split screw heads) and eliminating the cost of resurfacing screw-driver scars.

The Phillips Screw is certainly the *modern* fastening method — which means "better" and "more economical." Any of the firms below can supply you.

PHILLIPS RECESSED HEAD SCREWS GIVE YOU 2 for 1 (SPEED AT LOWER COST)

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS • SCREWS WITH LOCK WASHERS

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N.H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N.Y.
Pawtucket Screw Co., Pawtucket, R.I.
Pheoll Manufacturing Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N.H.

such as licenses, permits, sale and use taxes, etc., *are allowed* as cost. Set these taxes up as a separate item. Where federal excise taxes apply to materials you are using in filling your government contract, you can in most cases obtain a tax exemption certificate. Where a certificate is not obtainable, include the tax as a cost. Formerly federal agencies refused reimbursement of state sales and use taxes on the grounds that such a tax levied on a cost-plus contractor was a tax on the United States. The United States Supreme Court recently held, however, that cost-plus-fixed-fee contractors are not government instrumentalities and must pay state sales and use taxes. You should request a revision of contracts to include expressly such tax payments as a reimbursable item. Request also that the contracting officer approve as reimbursable tax payments made before the Supreme Court decision.

Communications Transmitted at Government Rates: The government gets 40 per cent off the commercial rate for all telegrams it sends, and it prefers to pay directly for the telegrams of its "fixed-fee" contractors so that the same saving may be applied. Audit regulations of the General Accounting Office require that as to official telegraph service the invoice must be certified by the telegraph company and be accompanied by the original copy of the message. A procedure similar to that required for telegrams will be followed in handling cable and radio services in connection with cost-plus-fixed-fee contracts. In the case of long-distance telephone calls, the telephone company should be informed that the communication is on official government business and exempt from federal tax. Keep records of such communications.

Changes and Extras: Keep in mind the difference between a change and an extra. A change, as the term is used in lump-sum contracts, relates to modifications in drawings or specifications or a change in shipping or packing particulars. An extra, on the other hand, is generally a change of more radical nature. The term connotes something *added* to the work rather than a mere alteration in detail. Both changes and extras can cause expensive additional work. Be sure to digest and understand these clauses thoroughly.

Lump-sum contracts reserve the right to the government to make changes by written order. If the changes entail increased expense and work, the contract will be modified to make an equitable adjustment. Any change order involving an increase or decrease of more than $500 must be approved in writing by the head of the department, or, in some contracts, by his representative. Although you are obligated to assert any claim for adjustment within ten days from the date the change is ordered, the contracting officer, if he determines that the facts justify the action, may consider a claim asserted at any time prior to final settlement. In this event, any adjustment which he decides upon must be approved by the head of the department or in some cases by his representative. Contracts permit no charge for extra work or material unless a written order is made by the contracting officer stating the price to be paid.

Cost-plus-fixed-fee contracts provide that the contracting officer may at any time by written order make changes in or additions to the drawings and specifications, issue additional instructions, require additional work or services, or direct the omission of work or services covered by the contract. In such event, the fixed fee may be modified. Construction contracts permit a modification of the fee only if the increase or decrease over the estimated cost amounts to 25 per cent of the cost estimate. Supply contracts require merely

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that the increase or decrease be material.

Construction contracts contain no time limitation on the filing of your claim, but supply contracts require that it be asserted within ten days after the change is ordered. In the case of construction contracts, any adjustment is subject to the approval of the secretary of war and is to be made upon completion—as distinguished from supply contracts which permit adjustment prior to final settlement (if the chief of the branch approves). If you negotiate a construction contract, ask that the usual clause be changed to permit adjustment prior to completion of the contract. While you will receive reimbursement of the cost of additional work along with the cost of the original work during construction, you may have greatly added expense and may need part of the fixed fee adjustment to aid you financially.

Changes and extras may be ordered, either by change order or supplemental agreement, the difference between the two instruments being that the first is merely a written order by a proper official directing you to make the change while the second is an agreement made and signed by both the contracting officer and you.

At any time before or after beginning work you may be directed to make changes or to do extra work. Certain precautions must be taken when you receive these instructions. If you fail to take these precautions, you may make costly mistakes which the purchasing and disbursing officers may not be able to rectify. When you later request an equitable adjustment from them, you may be sympathetically heard and then told that their hands are tied by laws and regulations. So keep these suggestions in mind and follow them.

Recommendation: Check your contract and be sure that the officer ordering the change or extra is the one designated and authorized by your contract to do so. Don't blindly follow the instructions of some officious unauthorized person. If you comply with the order of such a person, the proper official may later challenge the change and may order you to rip out the work and replace it according to the original specifications at your own expense.

Be sure that you have a written change order or supplemental agreement before complying with an order for extra work. If the contract requires that the order be approved by a higher authority, make sure that this approval is clearly endorsed on the face of the order.

Recommendation: Try to have your compensation for changes or extra work fixed at the time the order is made. What you consider to be an extra warranting additional compensation may be considered by the contracting officer to be a mere change in detail and he may not state the price in the order. Therefore, where a change involves additional expense and work on your part, be sure to submit a written statement of the price adjustment expected. Do this immediately upon receipt of the order. At the same time request either that the change order be redrafted to state the compensation or that a proper supplemental agreement be drawn. Otherwise you will have to arbitrate the additional compensation after the work is done. Remember, however, that under the usual clause the government's refusal to fix the price in advance does not justify your refusing to comply with the change order. It is wise, nevertheless, to submit the statement of the adjustment expected, even if your request is refused, since it gives notice of your claim and shows your good faith. It helps create a sympathetic attitude on the part of government

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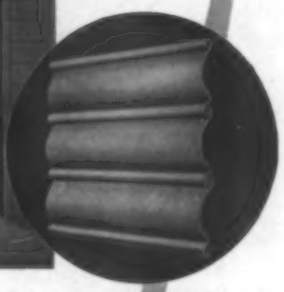

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officials when the dispute comes up for settlement.

Escalator, Target and Liquidated Damage Clauses Have Combined Effect: The government often combines escalator, target and liquidated damage clauses. The *escalator clause* is a device to protect you against increases in material, labor and other costs. The *target clause* rewards you for speed or economy in production or for technical performance above specification standards. The *liquidated damage clause* penalizes you for delays. The three together insure that you will conform to the rules of industrial efficiency. The sum total can be an advantage or disadvantage depending upon your technical ability.

Revised Escalator Clause: Recently, the War Department approved new types of labor and material quota clauses which modify the old method of establishing material and labor quotas and take into account actual as well as estimated cost. Indirect labor costs, such as executive and clerical help and indirect material costs such as lubricants, fuel, stationery, etc., are expressly included. Likewise, provision is made for any increase in payroll taxes.

The computation is modified as follows. The total *direct* labor and *direct* material cost is computed. *Indirect* labor cost is fixed at a percentage of the direct labor cost. Similarly, *indirect* material cost is fixed at a percentage of the direct material cost. Labor quotas are then fixed by apportioning the estimated labor cost in the proportion which the actual labor cost for the quota period bears to the total actual labor cost. This may be expressed in the following fraction: Labor quota for quota period equals total *estimated* labor cost multiplied by

$$\frac{\textit{actual}\text{ labor cost for quota period}}{\text{total actual labor cost}}$$

Material quotas are fixed in similar manner expressed in the following fraction: Material quota for quota period equals total *estimated* material cost multiplied by

$$\frac{\textit{actual}\text{ labor cost for quota period}}{\textit{total actual}\text{ material cost}}$$

The amount of the price adjustment due to direct labor and material cost increases is then computed on the basis of Labor Department statistics as in the case of the original quota clauses outlined above. To this amount is added the amount of the indirect labor and indirect material adjustments.

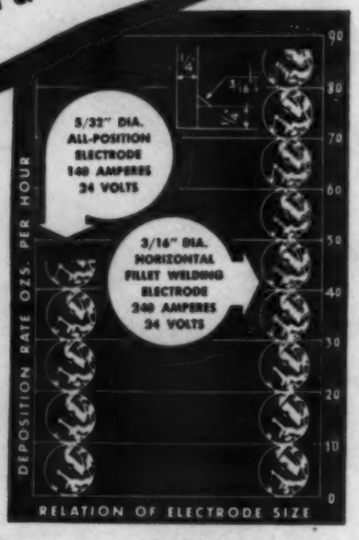
The indirect labor adjustment is computed by multiplying the amount of the direct labor adjustment by the percentage fixed (see above). The indirect material adjustment is computed similarly.

The price is adjusted to compensate for increases or decreases in payroll taxes by an amount calculated by multiplying (1) the amount of *actual direct* labor cost subject to the increase or decrease by (2) the rate of the increase or decrease.

Note that the new clause includes a provision for a modification of the total estimated labor and material costs in the event of change in the production method upon which the estimate was based due to subcontracting, etc.

Recommendation: The new provision corrects one unfair characteristic of the old quota clause. You need no longer worry about apportioning labor and material costs to the quarterly periods so long as the job is completed on time. All other objections to the old clause continue, however. You are still open to loss in the event of late deliveries. Furthermore, your actual cost may still vary from the quota due to an actual rate of change higher or lower than the rate determined by the Department of Labor. Ideal provision would eliminate "quotas" and so offset

HOW LARGER SIZES OF ELECTRODES CAN INCREASE YOUR WELDING PRODUCTION



You can speed up fabrication in your welding shop immeasurably by using the largest sizes of rods that are practical for their applications, as, under normal conditions and when proper currents are used, the greater the electrode diameter the higher is the resulting deposition rate.

The accompanying table shows the application of this principle to the making of a 3/16" fillet weld in ¼" plate. The 5/32" diameter all-position electrode has a deposition rate of only 46 ounces per hour. Should it be possible to use a 3/16" diameter mineral coated rod, designed for horizontal fillet welding, which operates at high currents and permits a very fast rate of travel, the deposition rate jumps to 87 ounces per hour.

By specifying the larger sizes and using the all-mineral type coatings wherever possible, you will also enable us to increase *our* production and help relieve the electrode shortage, as we can manufacture these types much more quickly than the smaller diameters and other types of coated rods.

Murex engineers are available for consultation to manufacturers who are directly or indirectly engaged in war production—whether or not they are users of Murex electrodes.

Specialists in welding for nearly 40 years. Manufacturers of Murex Electrodes for arc welding and of Thermit for repair and fabrication of heavy parts.

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the actual increase in labor and material cost against the total estimated cost so that the price is increased or decreased in an amount representing your actual increase or decrease rather than the purely fictitious figure, based on the average rate fixed by the Labor Department, now used.

Target Clauses: Certain contracts contain a clause for the payment of a premium to the contractor for each unit up to a stated maximum in excess of the amount specified; or a bonus for early delivery or for a reduction in cost below the estimated amount.

If you have confidence in your ability to do a good job, try to obtain an appropriate bonus clause in your contract. Your profits may be substantially increased. Do not quote inflated prices, however, in the expectation of receiving a bonus for delivering at the lower price you would have quoted if no such bonus were offered. Aside from legal proceedings you may be cut off from all government work. One way the government may prevent such exploitation of the national emergency is by including in the contract a clause to the effect that you must not go beyond a "fair market price".

Crane Cabs

(*Continued from Page* 102)

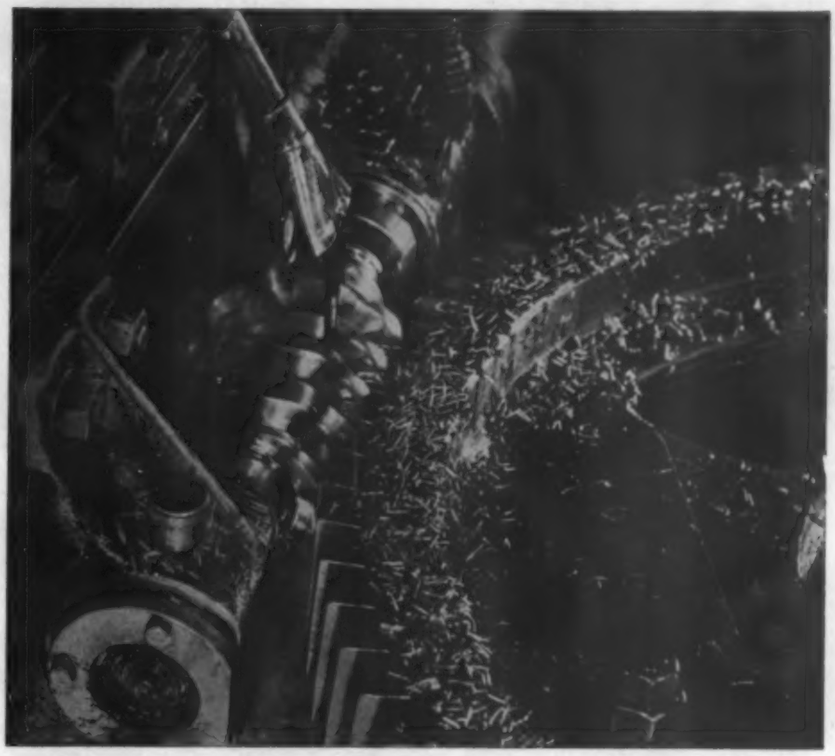
equipped with an 8-row, direct-expansion cooling coil with a special high-pressure thermostatic expansion valve. The fan used is a direct-connected 700 cubic foot per minute blower driven by a special ¼-horsepower 860 revolutions per minute high-temperature motor, the available current being 230 volts direct current. The air conditioner has two permanent washable air filter cells. The supply air is distributed through a 16 x 12-inch adjustable directional register, situated on top of the air conditioning unit.

The 2-horsepower "Freon" refrigerating compressor, with the air-cooled condenser, is located on top of the cab, as shown in the illustration which was taken before the auxiliary condenser was added. The condensing unit motor is a special high-temperature design, similar to the fan motor. This condensing unit was made special for this job, being equipped with many special parts, such as bearings, gaskets, belts, fusible plugs, oil and pressure switch. Vibration elimination joints are built in the copper refrigerant lines connecting the condensing unit with the cooling coil.

The system in use since last April operated through the entire summer of 1941 with recording thermometers accurately measuring the temperatures in each cab constantly. The cooling results have been even better than anticipated.

However, there have been a few "headaches" in connection with this system. The first difficulty encountered was the necessity for doubling the amount of condensing surface and adding an auxiliary ventilating fan for that extra condenser surface. This change greatly improved the performance of the system. Incidentally, this is the only important change which has been made in the equipment since installation. The biggest trouble has been with the special high-temperature 2-horsepower direct-current motors on the condensing units. However, new motors of a different design have been furnished recently and these are expected to relieve the trouble.

Another difficulty has been with the thermostat installed in each cab, which tends to make and break the electrical starter circuit unnecessarily. It has been found necessary to have a thermostat in such a system because there are times when the cab is not over the crane pit, particularly during certain hours of



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the night shift, when the refrigerating capacity is much greater than required. It then lowers the temperature in the cab to 55 degrees Fahr. which is too cold for the operator. Hence it is desirable to have a thermostat as a low limit control, which is usually set at 80 degrees.

So far, no perfect answer has been found to this thermostat requirement, because it should be one that is absolutely "jarproof," due to the extreme shaking of the cab as it starts and stops suddenly, and also an instrument which will stand temperatures as high as 250 degrees Fahr., which may be encountered should the system fail temporarily while over the soaking pit. Furthermore, this instrument must have a reasonably close temperature differential. No thermostat has been found which is entirely satisfactory for this application. However, the unit now in use is suspended on a rubber swivel which permits it to move in all directions and seems to be giving fair results, although at times it still seems to break the circuit, because of the jarring. If necessary, however, the operation of the compressor can be made manual instead of automatic.

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One man can handle heavy dies alone. Not necessary to stop other machines to get help.

MORE production per day from your machines if a Shoplifter is handy to do the heavy job of moving dies from storage racks to the press. In these times when maximum production of machines is of vital importance, much time and labor can be saved if the operator can handle the heavy work of changing dies without calling for help from other operators.

The Shoplifter is built for this job. Dependable and safe with a rated capacity of 500 lbs. (heavier machines up to 5000 lbs. can be furnished). Entire machine built of structural steel. Electrically welded throughout. Platform lifts 57" above floor and lowers to within 8¼" of floor. Overall height 72". Size of platform 24"x24" steel plate. Crank, up and down, hoist unit.

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Poor health causes a direct wage loss to employes of approximately 1 billion dollars each year. Disbursements for medical care, hospital and operation fees, employe turnover and inefficient production show a total loss of 10 billion dollars each year.

To offset its forementioned statistics, and especially to prevent any interruption of vital war production, Commercial Films Inc., 1800 East Thirtieth street, Cleveland, is distributing a new series of health-education sound films for workers. Each presentation, according to the company, stresses the importance of health safeguards for the welfare of the individual, his family and the nation as a whole.

"Take Care of Yourself", the introductory film of the series, already released, dramatizes the importance of common sense in health matters. "The Cold Bug", "Food Keeps You Fit", and "Stay on the Beam" will be released shortly. Following subjects will include care of the teeth, nervous fatigue, indigestion, cleanliness, recreation and exercise, hygiene of the body openings, etc. These films can be secured for a moderate purchase fee ($12.50 per film and record set).

Issues Second Report on Refractory Materials

Second report on Refractory Materials by the Joint Refractories Research Committee of the Iron and Steel Industrial Research Council and the British Refractories Research Association has been issued as No. 128 by the Iron and Steel Institute, 4, Grosvenor Gardens, London, S.W.1. It covers steelworks and blast furnace refractories in its 168 pages.

Welding, Metal Cutting

Welding and Metal Cutting, fabrikoid; 112 pages, 5½ x 8½ inches; published by Chemical Publishing Co. Inc., Brooklyn, N. Y., for $2.50.

This book was prepared by a staff of technical experts under direction of E. Molloy and deals with oxy-acetylene, electric arc, resistance and thermit welding and oxygen cutting.

It is intended to give the mechanical engineer a practical survey of the three main types of welding which he is likely to encounter. These are dealt with in early chapters and thermit welding, highly specialized, in a later chapter. Metal cutting follows, covering both oxy-acetylene and oxygen processes.

Helpful Literature

1. Roofing Equipment

Koppers Co.—36-page illustrated bulletin contains detailed specifications for coal tar pitch roofing, waterproofing, dampproofing, flashings and roof insulation. Information is given on advantages of coal tar pitch for roofs; methods of installation over various base materials such as poured concrete, precast concrete blocks, wood and steel; and procedure for making moisture-proof flashings.

2. Steel Calculator

Allegheny Ludlum Steel Corp.—4 x 9-inch slide-rule type calculator enables user to compute weights of steel sheets, strip, flats and bars. By setting known dimensions on slide, weight of steel products can be determined in accordance with lengths. Use of factors permits calculations dealing with alloys.

3. Hydraulic Cylinders

Hanna Engineering Works — 20-page illustrated catalog No. 229 describes hydraulic cylinders for working pressures up to 1500 pounds per square inch. Capacities, design details, dimensional details and applications data are given. Also described are low pressure air cylinders for power movement in any direction, control valves and foot operated valves.

4. Stamping Machines

Chambersburg Engineering Co.—36-page illustrated bulletin No. 276 is descriptive of "Cecostamp" high production, impact type stamping machine developed for forming thin, hot work that cools quickly. It may be used for embossing, as well as for work difficult to set to final shape. Machine is adaptable to producing small-quantity, short-run work.

5. Slotting Attachment

Experimental Tool & Die Co.—4-page illustrated bulletin, "Double Duty" explains application of "Slotmaster" universal slotting head which can be attached to all makes of milling machines. Details of operation, work combinations, construction and typical machining operations are described.

6. Graphite Lubrication

Acheson Colloids Corp.—6-page illustrated technical bulletin No. 112.6 entitled, "The Value of Colloidal Graphite for Assembly and Running-In," is one of series of treatises on use of colloidal graphite in industry. Methods of running in machines, engines and bearing assemblies are treated in detail.

7. Fire Extinguisher

C-O-Two Fire Equipment Co.—8-page illustrated bulletin, "In Case of Fire," describes application of carbon dioxide type extinguishing equipment for combating fires in plants using paints, lacquers, grease, oil, gasoline, alcohol or electrical devices. Portable and stationary types of systems are described.

8. Milling Machines

Blank & Buxton Machinery Co.—8-page illustrated bulletin No. 6 gives complete specifications on line of "Index" mills. These machine tools are described and construction features are pointed out. Typical machining operations are covered.

9. Electric Controls

Electric Controller & Manufacturing Co. — Addenda to "EC&M Bulletin Binder" includes new index and checking list, 10 new bulletins and 16 revised price sheets. Addition of these bulletins and sheets brings catalog up to date.

10. Rubber Conservation

B. F. Goodrich Co.—48-page illustrated booklet, "Will America Have to Jack Up Its 29,000,000 Automobiles?" emphasizes the need for strictest conservation of rubber. Suggestions are offered to motorists on how to extend the life of tires.

11. Transformers

General Electric Co.—18-page, plastic-bound illustrated bulletin No. GES-2974 gives full details regarding "Pyranol" transformers for use in industrial plants. Advantages of these transformers which use non-combustible coolant are pointed out. Typical installations and suggested layouts are included.

12. Cut-Off Machine

A. P. de Sanno & Son, Inc.—Illustrated data sheet is descriptive of "Radiac" type N abrasive wet cut-off machine for cutting solid metal up to 1¼-inch diameter and tubing up to 2-inch diameter. Specifications of machine are given and details of operation are pointed out.

13. Forged Products

Lenape Hydraulic Pressing & Forging Co.—32-page illustrated bulletin lists data on "Red Man" welding necks, nozzles, elliptical handhole and manhole saddles, fittings, and forged specialties. Tables, amplified with line drawings, give complete specifications, as well as application information.

14. Tanks

Buffalo Tank Corp.—288-page spiral-bound handbook of welded steel plate construction contains design data and general information on tanks, pressure vessels, tank heads, smoke stacks, and welding service. General engineering data given include tables of information on cylinders, spheres, circles, arcs, section properties, weights, measures and other useful details.

15. Pyrometers

Brown Instrument Co.—40-page illustrated catalog No. 1105 deals with potentiometer pyrometers. Closeup photographs show details of design, construction, and operation of single and multiple recording, self-balancing indicating and radiation pyrometers. Air and electric operated instruments are described, as well as complete line of accessories.

16. Copper & Iron Alloys

Cramp Brass & Iron Foundries division, Baldwin Locomotive Works—40-page engineering reference catalog contains information on brass, bronze and iron alloys. Contents include details concerning "P-M-G", silicate bronze made without tin; and composition, application and physical properties of 31 other alloys.

17. Diesel Tractors

Caterpillar Tractor Co.—32-page pictorial type bulletin No. 7283 is entitled, "Caterpillar Diesel . . . On Guard!" Graphic picture is painted on how products of this company are now being applied in war industries, construction of war plants, handling of war materiel and prime mover service. Construction features of "Caterpillar" diesel engines are explained.

18. Metal Cleaning

American Foundry Equipment Co.—4-page illustrated bulletin No. 54 announces new portable "Wheelbrator" which can be used on wide variety of large or small, intricate or irregular shaped work in jobbing shops or where daily production of various parts does not warrant special equipment for particular jobs. Construction, specifications and operation are covered.

19. Bearings

Johnson Bronze Co.—6-page illustrated bulletin, "Pre-Cast Bearing Bronze on Steel," describes construction and applications of this bearing material which combines strength of steel with bearing qualities of bronze. Sleeve bearing data given include average chemical composition and physical properties.

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20. Insulation

Johns-Manville—32-page illustrated catalog No. IN-55A contains complete information on line of insulating products for use in industry. Insulation materials described include sheet and block for heated surfaces, insulating brick, pipe insulation, brick, finishing cements, fillers and low temperature insulations. Recommendations are given for specific industries.

21. Nickel Alloys

International Nickel Co.—16-page illustrated bulletin No. T-12 contains technical information on machining of "Monel" metals, "Inconel" and nickel. Such subjects as stock, mechanical properties, tool design, cutting compounds, cutting-off operations, turning and boring, drilling, reaming, tapping, threading, chasing, planing, milling and grinding are covered.

22. Bronze Bearings

Bound Brook Oil-Less Bearing Co.—8-page illustrated bulletin lists installation data for "Compo" oil-retaining porous bronze bearings. Covered are such subjects as dimensions, determination of press fit, inserting plug, burnishing, machining, restoring oil flow after machining, molding in place, shaft clearances and permissible loads.

23. Cowl Fasteners

Shakeproof Inc.—36-page illustrated catalog No. AD-1 contains engineering and procurement data on "Shakeproof" cowl fasteners. Important features, installation data, engineering, advantages, outlines of testing equipment used to check fasteners, and other information are enumerated.

24. Grinding Wheels

Norton Co.—6-page illustrated folder, "Boost Production on your O.D. Grinding Jobs . . . Centerless and Cylindrical," points out advantages of "Norton" abrasive wheels on traverse cylindrical and throughfeed centerless traverse work, as well as on plunge-cut grinding operations.

25. Resistors

Westinghouse Electric & Manufacturing Co.—8-page catalog section No. 43-820 describes sectional resistors for alternating and direct current circuits in non-inductive, wire-wound and hermetically sealed types. Outlined are features of each type with emphasis on their construction, flexibility, and interchangeability.

26. Rubber Hose Care

Manhattan Rubber Manufacturing division, Raybestos-Manhattan, Inc.—Two 8½ x 11-inch wall cards deal with care of rubber hose. One is devoted to proper care of fire hose, and other lists rules for proper care of air, water, and other types of rubber hose.

27. Floor Cleaning

Magnus Chemical Co.—20-page bulletin No. 62 covers subject of "The Cleaning of Industrial Floors." Types of floors covered are concrete, wood, painted or varnished, linoleum, cork tile, rubber and terrazzo. Recommended company products are featured.

28. Boiler Room Valves

Everlasting Valve Co.—32-page illustrated bulletin No. E-100 describes quick-operating valves for blow-off, water columns and other boiler room services. Features of valve designs are explained. Specifications, dimensions and prices of various units in line are given.

29. Recorders

Leeds & Northrup Co.—12-page illustrated catalog N-27 describes "Micromax Speed" recorders which measure and automatically record speed of rotating machinery with high accuracy and reliability, making possible close speed regulation, better product quality and best use of process machinery.

30. Cold Finished Bars

LaSalle Steel Co.—8-page illustrated bulletin No. 75C is entitled, "Why 'Stressproof' Cold Finished Bars Are Being Used in Over 500 Applicatioins." Enumerated are nominal compositions, typical physical properties, case histories, savings effect through elimination of heat treating, and representative applications.

31. Electric Hot Plates

Hevi Duty Electric Co.—2-page illustrated data sheet No. HD-835 covers uses, construction, temperature ranges in standard and special designs, voltages, control, operation and specifications of "Multiple Unit" electric hot plates for laboratory, industrial and process applications.

32. Grinding Machines

Cincinnati Grinders Inc.—20-page illustrated bulletin No. G-490 gives complete details regarding design, application and operation of model ER "Cincinnati" 10-inch plain hydraulic grinding machines. All features are explained in detail through use of close-up photographs and explanatory text matter.

33. Tubes & Plates

American Brass Co.—56-page illustrated bulletin No. B-2, fifth edition, describes "Anaconda" tubes and plates for condensers and heat exchangers for use in marine and stationary steam power plants, oil refineries and other process industries. Covered are subjects of corrosion factors to be considered; condenser tube alloys; tube sheets, head and baffle plates; manufacturing methods; installation data; tentative specifications; and physical properties.

34. Electric Fans

Emerson Electric Manufacturing Co.—8-page illustrated consumer folder No. X4563 presents typical installations of electric exhaust fans in business establishments. Construction features of direct-drive exhaust fans are explained and details of belt-driven units are shown.

35. Dust Control System

American Air Filter Co.—32-page illustrated bulletin is titled, "AAF in Industry." It covers subjects of industrial dust problems, atmospheric dust, process dusts and filtered air for industrial ventilation and air conditioning, for drying operations, in product finishing, and for control of bacteria and mold spores.

36. Gage Design Standards

Lincoln Park Tool & Gage Co.—16-page bulletin is entitled, "American Gage Design Standards." It contains material compiled from information published by National Bureau of Standards, U. S. Department of Commerce, and is essentially of interest to inspection men and engineers.

37. Bronze Alloys

Ampco Metal, Inc.—6-page illustrated bulletin discusses value of "Ampco" metal for use in bearings and bushings. Features, advantages and applications are related.

38. Oil Burning System

Peabody Engineering Corp.—4-page illustrated bulletin No. 107 outlines salient features of wide range oil burning system which provides simple positive and flexible control of combustion over wide range of capacity, in excess of 50 to 1, when required. Flowsheets show installation details.

39. Flexible Couplings

Poole Foundry & Machine Co.—70-page illustrated catalog No. 42 treats subject of "Flexible Couplings, their Value and Many Advantages." Numerous illustrations show representative installations. Tables list complete specifications for range of sizes and models.

40. Expansion Joints

American District Steam Co.—14-page looseleaf section No. 35-15B describes various model piston-ring type expansion joints. Capacities, dimensions, features, types, amounts of traverse and recommendations are given for complete range of sizes and models.

41. Heat Treating Furnaces

Surface Combustion—8-page folder gives general information on company's facilities for designing and installing heat treating furnaces for armament production. Case histories are cited and representative installations depicted.

STEEL *Readers' Service Dept.*

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Steel Reinforcing Bar Standards Revised

WASHINGTON

Division of Simplified Practice, National Bureau of Standards, announced revision of the simplified list of cross-sectional areas for steel reinforcing bars, effective from June 15.

First edition of this recommendation, approved by the industry in 1924, established 11 cross-sectional areas, purpose being to retain as many advantages possible which had accrued to the industry as a result of simplification during World War I, under the Conservation Division of the War Industries Board. The 1924 list reduced the prevailing variety of sizes from 32 to 11, an elimination of more than 65 per cent.

A revision in 1930 left undisturbed the listing of 11 cross-sectional areas, but expressed those areas in hundredths, instead of thousandths of a square inch. This simplified further the work of engineering design where reinforced concrete is used.

The industry, therefore, was prepared at the advent of the present war to effect a further reduction in variety, if such action would further conserve materials, rolls and manpower for war. Consequently, simplified practice R26-30 was revised in May, 1942, to dispense with the use of ½-inch square bar for the duration.

Besides the simplified schedule, the new publication, "R26-42, Steel Reinforcing Bars," will include a brief history of the development of the project. At present free mimeographed copies of this revision may be obtained from the National Bu reau of Standards.

Scrap Dealers Protest Direct Buying Proposal

Protests against a statement by the WPB Bureau of Industrial Conservation that the government might request steel mills to buy scrap metal direct and prepare it for the furnaces in their own yards were lodged by representatives of the Institute of Scrap Iron and Steel at a conference with Lessing J. Rosenwald, BIC chief, and Merrill Stubbs, head of the bureau's auto wrecker division, in Washington last week.

The statement, issued by Mr. Rosenwald, contended there is danger of a bottleneck in dealers' yards in some localities due to the increased volume of scrap being moved. Direct buying by the steel mills, said Mr. Rosenwald, would insure maintenance of the price structure and would also enable the mills to accumulate inventories for use during the winter months.

Before the conference between institute representatives and the WPB officials, a canvass of the situation in dealers' yards was made by a special committee of the institute. The committee included: Isaac Bierman, St. Louis; Leo J. Kelleher, Greensboro, N. C.; Maurice A. Schalefer, Detroit; Robert Amper, McKeesport, Pa.; Sam Urdang, Cleveland; Harry Kirchman, Philadelphia; Jay Risman, Buffalo; Sam Bassow, New York; and Nathan Katz, Hartford, Conn.

Consensus of the committee was that although scrap has been coming out in increasing volume, due partially to seasonal conditions and also to various salvage drives, the yards in which there is any substantial accumulation of prepared or unprepared scrap are exceptional.

Committee also was unanimous in the belief that cases where dealers have reduced their buying prices were exceptional.

The institute committee stressed the danger to the government's salvage program if the break in nonferrous scrap prices should spread to iron and steel scrap.

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MARKET SUMMARY

DEMAND

Heavy for war purposes; high priorities crowded.

PRODUCTION

Unchanged at 99 per cent for fourth consecutive week.

PRICES

Steady under ceilings; maximum set for fabricated reinforcing.

WPB Rules Aid War Steel Distribution

Tendency of orders to congest A-1-a rating continues . . . Plate production passes million tons in May . . . Ingot output only shade under all-time high . . . Scrap supply continues sufficient

MORE efficient distribution of steel and iron products is being achieved under War Production Board regulations and enlarged production is making for a better situation in many products.

While application of priority to ingot output is limiting supply of semifinished steel for some uses, notably in sheets and wire, salutary effects are attained in volume of heavier products essential to the war, including plates, structurals and bars. In cases where need for the former is pressing directives are issued to cover essential supply.

Decrease in number of steel orders continues although total volume is greater than production, even at the current high rate. Practically all new bookings are in the A-1 group, by far the larger portion at A-1-a. Cancellation of unrated tonnage is virtually completed and mill books are in better condition than for a year. Even with this reduction order books contain tonnage for full production for many months.

Some plain carbon bar sellers recently have been able in exceptional cases to give fairly definite delivery promises on orders as low as A-1-c at about three months, subject to interference by directives. On alloy bars nothing under A-1-a is considered and 20 to 25 weeks is promised.

Growing use of alloy steels is indicated by the fact that 1941 steel output was 9.9 per cent alloy and this year promises to produce twice as much alloy steel as the best peacetime year.

Steelmaking activity last week remained at 99 per cent of capacity, for the fourth week, an exceptionally high sustained level. Cincinnati advanced 3½ points to 95 per cent, New England 6 points to 95 and Youngstown 1 point to 95. Chicago lost ½-point further, to 104 per cent, St. Louis 2½ points to 95½, Detroit 1 point to 86 and Wheeling 3½ points to 78 per cent. Unchanged rates were held at Birmingham, 95; Buffalo, 90½; Eastern Pennsylvania, 96; Pittsburgh, 95½; Cleveland, 94.

After War Production Board had repeatedly refused permission for a 1500-mile pipeline from Texas to the Atlantic seaboard, estimated to require 400,000 tons of steel pipe, it has given permission for a 550-mile line from Longview, Tex., to Salem, Ill., connecting with lines to the East, which will require 125,000 tons of seamless steel tubing, thus relieving plate mills of the burden.

Plate production in May reached 1,012,195 tons, exceeding by 116,223 tons the previous mark of 895,971 tons made in April. Contribution to plate tonnage by converting continuous strip mills to plate production is indicated by the total of 425,211 tons rolled on these mills in May.

Steel ingot and castings production in May totaled 7,386,890 net tons, 264,577 tons more than in April and 342,325 tons more than in May, 1941, the latter being a gain of 5 per cent. The May total was within a fraction of 1 per cent of the all-time peak attained in March, this year, lacking only 6021 tons of equaling. Relating ingot tonnage produced to steelmaking capacity the industry operated at an average of 98.2 per cent, the same as in March. In May, 1941, the industry operated at 98.5 per cent on substantially less capacity than at present.

Steel Corp. shipments in May were the largest since October, 1941, reaching 1,834,127 net tons, an increase of 75,233 tons over April and 88,832 tons over May, 1941. For five months the corporation's shipments have aggregated 8,729,439 tons, compared with 8,384,240 tons in the comparable period in 1941. This is an increase of 345,199 tons.

Scrap supply continues surprisingly good and search for hidden sources continues unremittingly. In some instances reserves are being established but in most cases these are far smaller than normal for this season. For the first time in many months supply of cast grades is in excess of demand and in some areas not all dealer offerings are being taken. While the current situation is comfortable, fears are held in regard to winter supply. At the present high rate of steel production most melters use scrap almost as fast as it is received and accumulation is difficult.

Composite prices have undergone no change from prevailing levels, finished steel at $56.73, semifinished steel at $36, steelmaking pig iron at $23.05 and steelmaking scrap at $19.17.

COMPOSITE MARKET AVERAGES

	June 13	June 6	May 30	One Month Ago May, 1942	Three Months Ago Mar., 1942	One Year Ago June, 1941	Five Years Ago June, 1937
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.18
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	22.84
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	17.05

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	June 13, 1942	May 1942	Mar. 1942	June 1941
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.49	2.48	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.22	2.2175	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	June 13, 1942	May 1942	Mar. 1942	June 1941
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$25.34
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.34	25.39	25.365	25.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	24.06
No. 2X, del. Phila. (differ. av.)	26.215	26.265	26.24	26.215
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.54	31.54	31.34	31.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.65	140.65	125.39	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	17.75
Heavy melting steel, Chicago	18.75	18.85	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	21.50

Coke

Connellsville, furnace, ovens	$6.00	$6.00	$6.00	$6.25
Connellsville, foundry, ovens	7.25	7.25	7.25	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942 The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh base, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bil.) $36.00.
(Wheeling Steel Corp. allocated 21,000 tons 2" square, base grade rerolling billets under lease-lend during first quarter 1942 at $37, f.o.b. Portsmouth, O.; Andrews Steel Co. may quote carbon steel slabs $41 gross ton at established basing points.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $32.00; 12-18 in., $54.00; 18 in. and over. $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel sheet bars at $39 gross ton, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., $1.90.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.
Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10 Galveston, $0.27. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, all-rail 2.59c Pac. ports, dock 2.50c; all rail 3.25c. (Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points.) Joslyn Mfg. Co. may quote 2.35c, Chicago base.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c Detroit, del. 2.82c.

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	5100 Spr. flats	0.15
2100	0.75	5100 80-1.10 Cr	0.15
2300	1.70	6100 Bars	1.20
2500	2.55	6100 Spr. flats	0.85
3100	0.70	Carb., Van.	0.85
3200	1.35	9200 Spr. flats	0.15
3300	3.80	9200 Spr. rounds, squares	0.40
3400	3.20	T 1300, Mn, mean 1.51-2.00	0.10
4100 .15-25 Mo. 46.00 .20-.30 Mo. 1.50-2.00; Ni.	0.55 1.20	Do., carbon under 0.20 max.	0.35

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.27c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.28c; New York del., 2.35c Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.41c; Phila. del. 3.39c; Pacific ports, 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c Phila. del. 3.68c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage,

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)
Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.
Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.
Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.
Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.
Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.
Manufacturing Ternes: Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.
Roofing Ternes: Pittsburgh base per package 112 sheets, 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c.
(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. may quote plates at 2.20c, f.o.b. basing points.)
Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.
Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c.
(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points.)
Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c
Wire Products to the Trade:	
Standard and cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	67
Do., 11 gage and heavier	70
Barbed wire, 80-rod spool, col.	70
Twisted barbless wire, col.	70
Single loop bale ties, col.	59
Fence posts, carloads, col.	69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-6	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.
*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.
High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	..	67.00c
18.00	4	2	1	77.00c
18.00	4	3	1	87.00c
1.5	4	1	8.5	54.00c
.....	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

CHROMIUM NICKEL STEEL

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
*317	50.00	54.00	58.00	50.00	58.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	‡‡18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. ‡‡Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.
Extras mean additions or deductions from base prices in effect April 16, 1941.
Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.
Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin of shipment.
Dislocated tonnage: Producers shipping material outside their usual marketing areas because of the war emergency may charge the basing point price nearest place of production plus actual cost of transportation to destination.
Seconds or off-grade iron or steel products cannot be sold at delivered prices exceeding those applying to material of prime quality.
Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941. Domestic or export extras may be used in case of Lease-Lend tonnage.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅞ and ⅝ x 6-in. and shorter	63½ off
Do., ⅝ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex.	U.S.S.	S.A.E.
⅞-inch and less	62	64
1-1⅛-inch	59	60
1¼-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo	2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	$6.00
Connellsville, foundry	7.00- 7.50
Connellsville prem. fdry.	7.25- 7.60
New River, foundry	8.00- 8.25
Wise county, foundry	7.50
Wise county, furnace	6.50
By-Product Foundry	
Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do. less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls. to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.00

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.62	26.12	27.62	27.12
Brooklyn, N. Y., del.	27.65	.....	.....	28.15
Birdsboro, Pa., del.	25.00	24.50	26.00	25.50
Birmingham, base	†20.38	†19.00	.....	.....
Baltimore, del.	25.67	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	‡24.47	.....	.....	.....
Cincinnati, del.	24.30	22.92	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.24	.....	.....	.....
Philadelphia, del.	25.51	25.01	.....	.....
St. Louis, del.	‡24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.17	24.67	25.67	25.17
Muskegon, Mich., del.	27.38	.....	.....	27.38
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.47	24.97	25.97	25.47
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.45	25.95	26.95	26.45
Duluth, base	24.50	.....	25.00	24.50
St. Paul, del.	26.76	.....	27.26	26.76
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.68	24.68	.....	25.35
Neville Island, Pa., base	24.00	23.50	24.50	24.00
‡Pittsburgh, del., No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	.....	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	26.05	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.89	25.39	.....	26.39
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	26.06	25.56	26.56	26.06
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling irons, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn.	$28.00
Chicago, del.	31.54

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn.	$28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn.	33.00

Gray Forge

Neville Island, Pa.	$23.50
Valley, base	23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorous Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942.

Export Prices: In case of exports only, the governing basing point nearest point of production may be used, plus differentials and export transportation charges.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick	
Super Quality	
Pa., Mo., Ky.	$64.60
First Quality	
Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00
Second Quality	
Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00
Malleable Bung Brick	
All bases	$59.85
Silica Brick	
Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30
Ladle Brick (Pa., O., W. Va., Mo.)	
Dry press	$31.00
Wire cut	29.00
Magnesite	
Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Basic Brick	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$23.00-25.00
Do., barge	23.00-25.00
No. 2 lump	23.00-25.00

(OPA May 11 established maximum at Jan. 2, 1942, level.)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.65; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36.

Manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.50c; packed 5.75c; ton lots 6.00c; less-ton lots 6.25c; less 200-lb. lots 6.50c. Spot prices ½-cent higher.

Electrolytic manganese: 99.9% plus, less carlots, per lb. 42.00c.

Chromium Metal: Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers' plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton $128; ton lots $140.50. Spot $5 per ton higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot 5 cents per lb. higher.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producer's plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity, $1.10 per pound V.O. contained; spot 5 cents per pound higher.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ½-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.50c; ton lots

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1941

	Soft Bars	Hot-rolled Strip Bands	Hot-rolled Strip Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: S.A.E. 2300	Cold Drawn Bars: S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.68	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.65	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.04	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	4.92	3.45	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.50	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.35	5.00	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.38	4.23	4.98	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	7.12
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Chattanooga*	3.80	4.00	4.00	3.85	3.85	5.80	3.75	....	4.50	....	4.39	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	5.25	5.00	4.60	....	....
Houston, Tex.	3.75	4.30	4.30	4.05	4.05	5.50	4.00	....	5.25	....	6.90	....	....
Seattle	4.20	4.25	5.45	4.75	4.45	6.50	4.65	7.60	5.70	....	5.75	....	....
Los Angeles	4.50	4.95	6.80	4.50	4.50	6.75	4.65	6.50	5.85	....	6.10	10.55	9.55
San Francisco	3.95	4.50	6.25	4.65	4.35	6.35	4.55	6.40	6.10	....	6.80	10.80	9.80

*Not named in OPA price order.

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.25	....	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	8.80
San Francisco	5.45	9.80	8.80	8.65	9.05

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in B'ham., Memphis.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities, New Orleans; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-10,000 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 500-999, Los Angeles, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

EUROPEAN IRON, STEEL PRICES

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b. U.K. Ports	L	s	d
Merchant bars, 3-inch and over	$66.50	16	10	0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20	0	0
Structural shapes	2.95c	15	10	0
Ship plates	2.90c	16	2	6
Boiler plates	3.17c	17	12	6
Sheets, black, 24 gage	4.00c	22	5	0
Sheets, galvanized, corrugated, 24 gage	4.61c	25	12	6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.20	1	10	9

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

		L	s	d
Foundry No. 3 Pig Iron, Silicon 2.50-3.00	$25.79	6	8	0 (a)
Basic pig iron	24.28	6	0	6 (a)
Furnace coke, f.o.t. ovens	7.56	1	17	6
Billets, basic soft, 100-ton lots and over	49.37	12	5	0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14	10	6
Merchant bars, rounds and squares, under 3-inch	3.17c	17	12	0††
Shapes	2.77c	15	8	0††
Ship plates	2.91c	16	3	0††
Boiler plates	3.06c	17	0	6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22	15	0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26	2	6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23	15	0
Bands and strips, hot-rolled	3.30c	18	7	0

(a) del. Middlesbrough. 5s rebate to approved customers. ††Rebate 15s on certain conditions.

Ores

Lake Superior Iron Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.75
Old range nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.30

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	12.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

Gross ton c.i.f. Baltimore; dry basis; subject to penalties for guarantees

Indian and African, 2.8:1 lump, 48%	$39.00
South African (excluding war risk)	
No ratio lump, 44%	28.00
Do. 45%	29.00
Do. 46%	34.00
Do. concentrates, 48%	33.00
Do. 50%	34.00
Brazilian (nominal)	
2.5:1 lump, 44%	31.00
2.8:1 lump, 44%	32.50
3:1 lump, 48%	41.00
No ratio lump, 48%	35.00-35.50
Do. concentrate, 48%	33.00-33.50

Manganese Ore

Including war risk but not duty, cents per unit cargo lots

Caucasian, 50-52%	....
S. African, 48%	70.00-75.00
Indian, 50%	75.00
Brazilian, 48%	....
Chilean, 48%	75.00
Cuban, 51%, duty free	85.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

				Low Phos. Grades		ELECTRIC FURNACE AND FOUNDRY GRADES							
						Heavy Structural, Plate			Cut Auto Scrap				
	OPEN HEARTH GRADES*	Machine Shop Turnings	BLAST FURNACE GRADES*	Billet, Bloom Crops	Bar Crops and smaller; Punchings, Plate	3 ft. and less	2 ft. and less	1 ft. and less	3 ft. and less	2 ft. and less	1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$16.00	$16.00	$25.00	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Bethlehem	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Buffalo	19.25	15.25	15.25	24.25	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	15.50	15.50	24.50	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Detroit	17.85	13.85	13.85	22.85	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo		13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Kokomo	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth	18.00	14.00	14.00	23.00	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
St. Louis	17.50	13.50	13.50	22.50	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	13.00	13.00	22.00	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle	14.50	10.50	10.50	19.50	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50
Portland, Oreg.	.....	.....	.....	.....	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	21.00	22.00	23.50	24.00	24.25	24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	17.50	18.50	19.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

*Open Hearth Grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. Blast Furnace Grades refer to mixed borings and turnings, shoveling turnings, No. 2 busheling and cast iron borings. Add $5 per ton for chemical borings containing not over 0.5 per cent oil content.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, provided most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $2.50 less (railroad grades $3.50 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Graveyard autos not considered unprepared scrap.

Remote Scrap: Consists of all grades, except railroad scrap, located in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington and Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

Sheets, Strip

Sheet & Strip Prices, Page 120

Production of steel sheets moves steadily downward as orders are far below usual volume. Current rolling is confined to A-1-a ratings and semifinished steel usually alloted to this product is assigned to other high-demand products.

Re-rollers of narrow cold strip steel have a preponderance of high-carbon orders in backlogs which tends to throw production schedules, limited by annealing capacity, somewhat out of balance. Heavy bookings for gun clip and link fabrication continue, deliveries extending to six months or more. Most mills could handle more low-carbon volume with high ratings. New business about equals shipments.

Some sample shipments of NE alloy narrow strip are being made, but not for 60 to 90 days will production volume be likely with most producers, although some increase in orders for these alloys is noted.

Considerable cold strip tonnage is being offered from frozen stocks affected by limitation regulations, much of which is moving slowly; would-be sellers are reluctant to take a loss on cost charges, which have increased, while fabricators require high ratings to purchase the material which is frequently off specification for specific requirements or likely to run too heavily to scrap loss in fabrication.

Bars

Bar Prices, Page 120

Some sellers of plain carbon bars are able to make fairly definite delivery promise on tonnage down to A-1-c priorities; however, these are the exception and in no case do they appear to offer better than three months. Most producers make no definite commitments lower than A-1-a and these are subject to change, due to possibility of allocations.

Usual promises are eight to ten weeks on A-1-a tonnage, with medium sizes of rounds and flats subject to better delivery than larger and smaller sizes. Cold-finished bars average a week or ten days longer than hot-rolled. Hot and cold-rolled alloy bars with A-1-a ratings, nothing lower being considered, range at 20 to 25 weeks, nearer the latter.

Specifications are heavy with little change in deliveries, but on new business shipments on larger sizes are more extended on all finishes, alloys notably. Most alloy volume is tied in with old orders with top ratings and placing of new tonnage generally requires a directive. Deliveries on smaller hot-rolled rounds can be made in spots from six to eight weeks and current buying is centered on these sizes.

Forgers continue at capacity, above rated schedules by those supplying the aircraft industry. Along with some frozen stocks resulting from limitation orders, considerable tonnage, originally for export, including bars is being liquidated, plus steel purchased by the Netherlands which was to have been shipped to the Far East. Liquidation is hampered by the fact some of these materials were rolled to metric sizes.

Plates

Plate Prices, Page 121

Signs are not lacking that the extreme pressure for plates may ease shortly, result of broader allocations based more on inventories and increasing heavy production. Several mills have slightly improved their position, notably on narrower universal widths and jobbers expect slightly more tonnage against re-extended ratings during the latter half of the month. Miscellaneous fabricating shops engaged on war contracts with low reserves also have better allocations in some cases.

At the peak of the shipbuilding program, which is being approached, monthly requirements for plates for all purposes are estimated at 1,300,000 to 1,400,000 tons, yet the ratio of deliveries to shipbuilders of total production last month was only around one-third of the total. Shipyard inventories are being kept in better balance, but demand for plates in war production appears to be relatively as heavy for other armament, notably combat tanks, and many miscellaneous uses normally taking limited tonnage. In other words, while ship requirements are emphasized in pressure for plates, demand in

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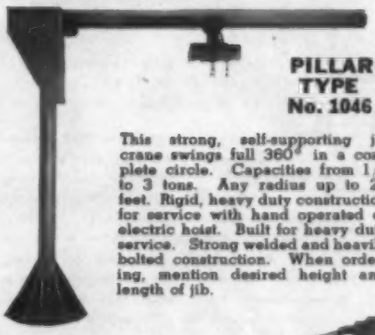
Speed War Production with

JIB CRANES

FASTER SAFER HANDLING AT LESS COST!

★ Make a quick survey of present handling operations in your plant, and you'll be quick to locate any slow production gaps. Consider then how these Jib Mounted Cranes (hand or electrically operated) will span those "in-between" spots and help you meet and even beat your war delivery schedules.

No. 1044
Swinging Bracket—Hand or Electric. 1/2 to 3 Tons and up to 20 ft. radius.



PILLAR TYPE No. 1046

This strong, self-supporting jib crane swings full 360° in a complete circle. Capacities from 1/2 to 3 tons. Any radius up to 20 feet. Rigid, heavy duty construction for service with hand operated or electric hoist. Built for heavy duty service. Strong welded and heavily bolted construction. When ordering, mention desired height and length of jib.

Chicago Tramrail Overhead Crane operating in Heat-Treating Room.

PILLAR TYPE No. 1016A

A self-supporting crane with 220 degree swing. Capacity up to 3000 lbs. with 14' radius. Furnished with hand or electric hoist, as required.

WRITE TODAY—Without obligation we will send circular showing new line of Jib Cranes and heavy duty handling units.

View of Chicago Tramrail Overhead Crane Installed in Large Steel Warehouse.

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other directions is quite as heavy in comparison.

Most plate producers are operating almost entirely on A-1-a tonnage, with some at lower priority under special directives. Producers are being asked this month for more operating detail, especially with respect to flanged and dished heads.

Plate production in May totaled 1,012,194 tons, exceeding by 100,000 tons the record set in April at 895,971 tons. May tonnage from continuous strip and sheet mills was 425,211 tons, compared with 337,915 in April. Deliveries to shipyards were more than 300,000 tons.

Effective June 6, Office of Price Administration order No 12 under revised schedule No. 6 for iron and steel products allows Granite City Steel Co., Granite City, Ill., to charge 2.35c base per pound, f.o.b. Granite City, on all carbon steel plates.

Pipe

Pipe Prices, Page 121

Permission for construction of a 550-mile petroleum pipe line from Longview, Tex., to Salem, Ill., to connect with existing lines leading to the East will result in placing about 125,000 tons of 24-inch seamless tubing with producers of that material. Ten pumping stations will be required, equipment for which will be ordered at once. Capacity of the line is estimated at 350,000 barrels of oil daily, which will be forwarded from Salem to the East by various means. Completion is set for Dec. 1.

With demand for butt-weld steel pipe falling off, distributors' stocks are generally sufficient to carry them for some weeks, although replacements are increasingly difficult. Lap-welded is in better demand, industrial and government buying predominating, notably the latter.

A large inquiry for welded wrought iron pipe, 150,000 feet, by a Navy purchasing office in the East brought out mixed quotations, some shading being done. This volume carries high A-1 rating, caused unusual competition, the priority allowing for re-extensions for replacements with mills. The opening also included heavy volume of plumbing supplies, including steel pipe.

A large quantity of high carbon bedstead quality steel tubing is also being offered from frozen or distressed stocks, some of which was originally for export. Bought above current ceiling prices with accumulated warehouse and handling charges added, much of this tubing is not attractive to distributors at current stabilized prices.

More basic iron is moving this month, more than offsetting shrinkage in foundry grades resulting from limited operation of iron foundries affected by ban on civilian business and at cast pressure pipe foundries which have slowed production while changing to meet new pipe specifications by the government.

Wire

Wire Prices, Page 121

Specifications against forward orders for wire products, some of which extend indefinitely, tend to be higher each month, lifting shipments slightly above incoming volume. Current orders are larger individually and more extended as to delivery against monthly releases but are fewer, with civilian requirements out of the picture. Finishing operations are geared to rod supplies and heat treating capacity, with output in some departments restricted. Most new business is in A-1 classifications, with little below A-1-c.

While nail production has been ordered increased, close to 50,000 tons per month, enlarged use of wood for building increases nail use and distributors are not receiving monthly quotas. For grain bins 2500 tons of nails has been allocated, a change from recent use of sheets, plates and light shapes.

Scattered stocks of wire frozen by limitation orders are appearing for sale at ceiling prices.

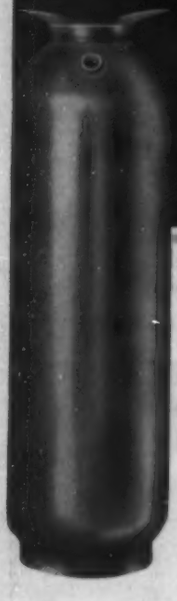
Rails, Cars

Track Material Prices, Page 121

Under carbuilding restrictions of the War Production Board domestic freight car awards in May were the lightest since January, 1940, total-

QUIZ FOR ENGINEERS INTERESTED IN:

faster production
improved product appearance
decreased over-all weight
increased strength
greater durability



1. Q: *How have many manufacturers been able to gain these advantages?*

A: By using Hackney deep drawn shapes . . . made from a solid, circular sheet or plate of ferrous or non-ferrous metals. They are cold-drawn to shape by means of high pressure, hydraulic presses, especially designed for the purpose.

2. Q: *What are the effects of this special cold drawing process?*

A: The Hackney Process provides a smoother finish, uniform thickness and eliminates possibility of flaws or laminations in the finished product. Strength, durability and better appearance are assured.

3. Q: *For what types of problems have Hackney design and manufacturing facilities provided the practical and economical solution?*

A: A varied range of products from air receivers, hydraulic accumulator housings, grease dispensing tanks, pressure tanks, fire extinguishers, carbonator drums, heat exchangers, boiler tanks to lightweight cylinders have been improved by the use of Hackney seamless drawn shells. They have been made with capacities as small as one quart and as large as 110 gallons.

4. Q: *Why do so many manufacturers ask for Pressed Steel Tank Company's co-operation in solving their problems?*

A: These manufacturers know that Pressed Steel Tank Company has specialized in the manufacture of seamless deep drawn shapes and shells of various sizes for more than 40 years. During that time, Hackney engineers have helped to solve numerous difficult engineering problems for manufacturers in many industries—producing many shapes and shells that have been classed as "out of the ordinary."

5. Q: *If you have a problem involving the use of seamless drawn tubes, shells, special cylindrical shapes or pressure tanks, how can you, too, get this co-operation?*

A: Write today to Pressed Steel Tank Company. A Hackney engineer may be able to suggest several ways in which you can improve your product. There is no obligation.

PRESSED STEEL TANK COMPANY

General Offices & Plant:
1461 So. 66th St., Milwaukee, Wisconsin
HACKNEY DEEP DRAWN SHAPES AND SHELLS

Hackney

Containers for Gases, Liquids and Solids

ing 822 units, of which the Bessemer & Lake Erie order for 800 ninety-ton hoppers was the principal factor. Awards for five months totaled 23,005 units, compared with 62,016 in the corresponding period last year. No awards have been made this month and June is expected to be another light month. Comparisons follow:

	1942	1941	1940	1939
Jan.	4,253	15,169	360	3
Feb.	11,725	5,508	1,147	2,259
March	4,080	8,074	3,104	800
April	2,125	14,645	2,077	3,095
May	822	18,630	2,010	2,051
5 mos.	23,005	62,016	8,698	8,208
June	.....	32,749	7,475	1,324
July	.....	6,459	5,846	110
Aug.	.....	2,668	7,525	2,814
Sept.	.....	4,470	9,735	23,000
Oct.	.....	2,499	12,195	19,634
Nov.	.....	2,222	8,234	2,650
Dec.	.....	8,406	7,181	35
Total	.....	121,499	66,889	57,775

Missouri Pacific railroad has been granted permission by the United States district court at St. Louis to purchase four 5400-horsepower diesel freight locomotives to meet increasing war transportation demands.

Structural Shapes

Structural Shape Prices, Page 121

Plans for broad allocation in shapes, such as prevails in plates, appear to have been abandoned indefinitely. Until recently it had been under consideration but its establishment was not considered worth the effort at this time, despite the tight situation in standard shapes. Shop deliveries average eight to ten weeks, due to heavy allocations and expanding demand from shipyards.

Plain structural material deliveries are tight. Structural mills are running at capacity where semi-finished steel supplies are sufficient, with part of the product going to previously booked construction work, but most to shipyards. One large eastern mill until recently has been operating its structural rolling equipment on plain shapes only eight hours a day, against 24 on some products, due to lack of ingots. Heavier allotment of steel is remedying this situation.

Curtailment of war plant construction has eliminated an aluminum plant in the Boston district and one at Philadelphia. Boston engineering contractors have plans for a group of synthetic rubber plants and while steel has been awarded for one in Texas, at least three or four are unplaced, though fairly certain to go ahead. Supplemental contracts covering additional construction at government yards are being designed to limit use of steel.

Tight situation in the East is reflected in purchase and dismantling of several steel buildings in upstate New York, including a brickyard shed, and their removal for re-erection at a new shipyard in New England. Other shipyard extensions on the east coast are mainly wood, including one in Delaware for which 6000 tons of steel had been placed provisionally. Indications are that at the present rate of curtailment fabricating shops will have reduced their backlogs to a minimum by the end of third quarter.

Reinforcing Bars

Reinforcing Bar Prices, Page 121

Mills are under pressure to meet delivery schedules against old orders and will accept tonnage only against top ratings, usually above A-1-c. Considerable work is being held in abeyance by low ratings, including several housing projects with priorities down to A-7. Demand for reinforcing for bridges and highways is the lowest in years. Some access roads in the East have been given A-1-e rating, with a minimum amount of steel included in the design.

OPA has announced maximum prices on fabricated reinforcing bars, effective June 15, at $2.40 per hundred pounds except in the state of Michigan and Toledo, O., and where bars are purchased on a Gulf or Pacific port basing point price. The new maximum prices allow a margin of 50 cents per hundred pounds over the cost of bars to the fabricator, excluding freight and extras. These are the prices at which approximately 75 per cent of fabricators were operating in April, 1941.

Philadelphia has obtained a rating of A-1-j on a filtration plant

Round and Square Packing made on FIDELITY Braiders.
#3—Square Packing Braider with Bottom Latch Carriers. Used to make ½" to 1" Square Packings.
#00—Square Packing Braider with Spring Carriers for producing smallest range of Packings.
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Speed—15 to 40% higher
Yarn Capacity—80 to 100% greater
FIDELITY Packing Braiders—single or multiple head . . . speed the production of round, square or special packings from asbestos, flax and jute yarns.
Bottom Latch and Spring Bottom Latch Carriers, used on FIDELITY Packing Braiders, operate at speeds 15 to 40% higher than the old type top weight carriers and have a yarn capacity 80 to 100% greater. Output varies according to size of packing and type of carrier . . . from 180 to 360 stitches per minute on Round Braiders . . . and from 60 to 500 stitches per minute on Square Braiders.
Low power consumption, stop motion protection, change gears for different size packings and use of larger yarn packages are other outstanding advantages of FIDELITY Packing Braiders.
FIDELITY manufactures a variety of machines for the Textile Industry, the Wire Field and for Rubber Organizations. Special machines are built for many lines of industry.
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FIDELITY MACHINE COMPANY
3908-18 Frankford Ave., Philadelphia, Pa.

requiring 4000 tons and may seek new bids. The same project was up several weeks ago under A-4 rating and failed to obtain bids.

Pig Iron

Pig Iron Prices, Page 122

Pig iron allocations tend to center in higher brackets, with inventory still a prominent factor in allotments. Some schedules for iron in the A-5 group have been pared, although above that rating most requests are granted. Inventories now are generally down to about 45 days, lower in most instances.

Foundries supplying the machine tool trade appear to be busiest. In spite of War Production Board restrictions most foundries are maintaining a fair rate of production, jobbing foundries generally being busy on priority work. However, many foundries find difficulty in obtaining war work. Stove and soil pipe producers are apprehensive for the future.

Blast furnaces are being kept in operation by an unusual job of maintenance, keeping stacks in operation when under normal conditions they would be interrupted. Present high pressure for production is hard on linings and some unusual jobs of repair have been done to avoid interruption. In the Pittsburgh district, in spite of the heavy pressure for months, only two stacks are under repair. In that area relining projects this year have taken less than 30 days in all but one case and a record of 24 days has been set. This condition cannot be maintained indefinitely and it is feared linings will begin to go when winter comes.

Jackson Iron & Steel Co., Jackson, O., blew in its rebuilt Jisco blast furnace June 8, with 25 per cent increase in capacity over the old stack.

Missouri Cliffs Mining Co., which controls most iron ore properties in the Missouri Ozarks, is opening mines in that area and has built a $40,000 ore washer, planning additional washers.

Scrap

Scrap Prices, Page 124

Some indications are seen of tightening in scrap supply, though present tonnage is sufficient for current steelmaking. This condition has appeared in the East. An increasing number of automobile wrecking yards are going out of business as their accumulations are cleared. The profitable part of this business in the past has been sale of usable parts for automobiles, scrap production being incidental. To continue in business they would be forced to conduct a scrap business, for which most are not equipped, and possibility of profit from sale of parts is questionable. It is believed regular scrap dealers may take over automobile wrecking to a large extent.

In the St. Louis district flow of scrap is adequate to the high rate of steel production but little is being laid down in reserves. Some gray iron foundries have been able to build up moderate stocks but war work by these industries is increasing, including mine equipment and stoves.

At Cincinnati demand for cast scrap and scrap rails is outrunning supply in spite of increased

IN the production of brass and aluminum fuses the reduction of "down time" to the least possible degree is all important!

Cutting operations on multi-spindle automatics, such as reaming, eccentric drilling, tapping and threading, respond to the application of Stuarts "Super-Kool" No. 151 Brass Cutting Oil, or Stuarts "Super-Kool" No. 1M Aluminum Cutting Oil frequently with a surprising improvement in tool life and finish.

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Tool Steel Scrap

Cents per pound, to consumers f.o.b. shipping point

Tungsten Types

(For each 1% tungsten contained)

Solid scrap containing over 12%	1.80c
Solid scrap containing 5 to 12%	1.60
Turnings, millings containing over 12%	1.60
Do., 5 to 12%	1.40
Turnings, millings, solids under 5%	1.25

Molybdenum Types

Solid scrap, not less than 7% molybdenum, 0.50 vanadium	12.50
Turnings, millings, same basis	10.50
Solid scrap, not less than 3% molybdenum, 4% tungsten, 1% vanadium	13.50
Turnings, millings, same basis	11.50

Mixed Scrap

(Molybdenum and Tungsten Types)

Solid scrap, each 1% contained tungsten	1.60
Solid scrap, each 1% molybdenum	.80
Millings, turnings, each 1% tungsten	1.40
Millings, turnings, each 1% molybdenum	.70

receipts resulting from collection campaigns. Winter supply is not being accumulated. Low phosphorus scrap supply is light compared with demand.

Buffalo consumers have received another cargo of 5000 tons from the Duluth area, making about 40,000 tons from that source this season. Cast scrap shipments to some foundries have been held up as supply from automobile wrecking operations has increased. Steelmaking grades also are coming out at a record rate but reserve accumulation is difficult under present high steel production rate.

New England foundries in numerous instances are not taking all cast grades offered from dealer yards and foundry scrap supply is ample for the moment, more so than heavy melting steel. Some of the latter continues to move to Jersey City by barge for rail shipment to eastern Pennsylvania. More street car rails are being allocated from salvage operations but little industrial scrap is reaching the open market, being distributed largely by private transactions.

Detroit melters are comfortably supplied for current needs but fear for the future. One plant June 1 had 22-day supply, with incoming shipments below May consumption rate; another plant requiring 40,000 tons per month has a ten-day supply.

Warehouse

Warehouse Prices, Page 123

Steel warehouse distributors experience increasing difficulty in getting steel against their A-1-k rating. Some strip, pipe and a few other items are available occasionally but reliance is placed mainly on such higher ratings as can be supplied under PD83G for replacements.

Warehousemen are unable to do much in complying with WPB request to decrease their quotas of schedule A products. War industry demand is far in excess of stocks and mills are not able to meet present quotas.

Some warehouses will accept only orders bearing the highest priority ratings, to assure obtaining additional steel replacements from mills. Theoretically, distributors can sell without rating, but with steelmakers unable to ship material on less than A-1-a, these distributors find they only strangle themselves.

Pacific Coast

Seattle — United States government is reported to have decided to build the northern section of the proposed Alaska railroad, engineers having opened an office at Prince George, British Columbia, from whence survey parties will be sent into the field next month, aided by aerial reconnaissance.

District branch office of WPB reports 35 contracts totaling $1,113,650, placed in May with small shops in Washington state, many of which have been converted to fabricate winches, steering engines and other equipment for the Maritime Commission and aircraft industry. Three months ago 90 per cent of these smaller plants were idle, but now operating two and some three shifts. Ten machine shops in Skagit and Whatcom counties are at full capacity with ship subcontracts.

Bethlehem Steel Co., Seattle, is building a fifth open-hearth furnace at the local plant, 4001 Twenty-eighth avenue Southwest. Open hearth structure is 84 x 50 feet, pit building 64 x 26, locker 21 x 18, and billet structure, 100 x 74 feet. Isaacson Iron Works, Seattle, is fabricating the steel framing.

Rolling mills and fabricating plants have backlogs extending into next year, practically all government work with A-1-a priorities. Sub-contracts have given the smaller machine and metal shops capacity operation, parts for the merchant marine fleet being widely distributed. The government's policy to advance payments to contractors and equipment and supplies is serving to spread contracts and eliminate bottlenecks.

In Seattle, both Army and Navy are expanding broadly and have taken large areas adjacent to existing facilities.

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Chips, borings and turnings can be a terrific nuisance in any shop where automatic screw machines, lathes and planers, etc., pile up daily heaps of metal refuse. This waste byproduct is too valuable to throw away and too bulky to store. The problem is solved by the American Ring Turnings Crusher. This crusher utilizes the famous rolling ring principle of crushing, quickly and economically reducing bulky turnings of low or high carbon steel, alloy steel or brass into "Chips".

American Ring Turning Crushers are built in various sizes; we will study your requirements, and recommend the proper size crusher for your particular needs.

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Rear View
Size No. 2400

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disappointed at failure of Whatcom county (Washington) P. U. D. to receive bids for proposed $5,875,000 utility bond issue with which it was planned to purchase the local holdings of Puget Sound Power & Light Co.

Steel scrap receipts are above normal, the salvage campaign bringing material from hidden sources, permitting local rolling mills to increase inventories. Foundries still complain of shortage of cast iron scrap but the situation is less acute.

Pipe sales are confined to contracts with high ratings, housing and defense projects getting preferences, small lots being sold out of stock. For King County District No. 61, 500 tons are pending. Several projects have recently gone transite because of better deliveries.

Iron Ore

Iron Ore Prices, Page 123

Due principally to further increases in war risk insurance, prices on imported manganese ores continue to advance. South African manganese, 48 per cent, is now holding at 70 to 75c per unit, Atlantic ports, before duty, with the market nearer the outside figure; Indian, 50 per cent, 75c; Brazilian, 48 per cent, and Chilean, 48 per cent, 70 to 75c, with the outside figure also the more representative in these cases. Cuban manganese ore, 51 per cent, is around 85c, duty free.

Manganese ore consumers assert their stocks are still in good shape and can see no real stringency ahead. Stocks are sufficient in the opinion of some trade leaders to meet requirements into 1944, if necessary. Prices are unquestionably moving upward, owing to war risk insurance, but there is a general feeling that ore will continue to be available for a long time.

A new record in Lake Superior iron ore loading was made June 5 when the steamer HARRY COULBY of the Interlake Steamship Co. fleet took on 16,607 tons at the Great Northern dock at Superior, Wis., for delivery to Youngstown Sheet & Tube Co.

Steel in Europe

Foreign Steel Prices, Page 123

London—(*By Cable*)—The feature of the British steel and iron market is expansion of output of alloy steels. Brisk demand is being met for light sections of bars and for strip but heavy structurals are quieter. Shipbuilders are covering their steel requirements over a long period, including a heavy tonnage of plates. Semifinished supplies are adequate, due to larger output of domestic mills.

Tin Plate

Tin Plate Prices, Page 121

Closing of Shenango tin plate works of Carnegie-Illinois Steel Corp. at New Castle, Pa., last week is partially a result of the WPB rule reducing quantity of tin plate available for third quarter by 10

Nonferrous Metal Prices

June	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures
1-12	12.00	12.12½	11.75	52.00	52.00

Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
6.50	6.35	8.25	15.00	14.50	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.75
Zinc, l.c.l.	13.15

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Dealers' Buying Prices
(In cents per pound, carlots)

Copper

No. 1 heavy	9.25-10.00
Light	7.25- 8.00

Brass

No. 1 composition	8.75- 9.50
Yellow brass castings	6.25- 7.25
Auto radiators	6.75- 7.25
Red Brass, borings & turnings	8.50- 9.25

Zinc

Old	5.00- 5.75
New clippings	6.50- 7.25

Aluminum

Clippings	10.00-11.00
Cast	8.75-10.00
Pistons	8.75-10.00
Sheet	9.00-10.50

Lead

Heavy	5.00- 5.85
Mixed babbitt	4.50- 6.75
Electrotype shells	5.00- 6.25
Stereotype, Linotype	6.25- 7.50

Tin and Alloys

Block tin pipe	44.00-46.00
No. 1 pewter	32.00-38.00
Solder joints	7.75-10.00

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l.	13.25
Standard No. 12 aluminum	14.50

per cent. In actual practice this is calculated to work out after July 1 to curtailment of 45 to 50 per cent of current tin plate production. Tin mill operations had been speeded up by government instructions to fill lend-lease shipments, none of the second-quarter tin being allowed to carry over to third quarter. Tin mill operators expect third-quarter plate operations will be cut sharply in the hot-dip plants, possibly to be increased later to aid the domestic canning business.

Nonferrous Metals

New York—Every buyer of nonferrous metals, as well as other materials, should become familiar with provisions of the Production Requirements Plan and the Allocation Classification System. Priorities Regulation No. 11, implementing PRP, provides for establishing definite quantitative limits to the acquisition of metals by any company using more than $5000 worth of metal in a calendar quarter. Class 1 producers are required to file a PRP application not later than June 30.

Copper—May production rose to new record highs of 101,683 tons of blister and 98,632 tons of refined copper, while deliveries to domestic consumers rose sharply to 134,079 tons. Stocks of refined metal declined to 77,383 tons at the end of May from 83,789 at the end of April. Refining capacity of the country is expected to be pressed as soon as Copper Recovery Corp. increases the flow of material previously frozen by WPB orders.

Lead—Supplies of pig lead are accumulating since military demands are rising slowly. WPB may relax some of the restrictions on the use of lead in civilian products.

Zinc—Smelters are producing over 2550 tons of metal per day, an excellent record for the industry.

Magnesium — Construction has started on a plant for the production of magnesium in the Toledo area. This plant will be owned by Defense Plant Corp. and will be operated by National Lead Co.

You are cordially invited to avail yourself of a little semi-technical information and a digest of 80 years pioneer work in the development of fine bearing metals . . .

The A. W. Cadman Manufacturing Co. has prepared two booklets, "Bearings and Bearing Metals", and "Cadman Metals". These booklets treat in intimate detail the history, function, properties and uses of bearings and fine bearing metals. To all who are concerned with this subject, the booklets will bring valuable information. You may obtain your copies simply by writing for them today. Requests entail no obligations, and the booklets are free.

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Etna has the swaging machines from ⅜" to 4" and the experience to help you get the most out of this type of machine.

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LEE-BUILT TRADE MARK SPRINGS

Canada

Toronto, Ont.—Steel ingot production in Canada is at 99 per cent capacity, providing a total of just over 8328 tons of steel per day. Despite this all time high record production for Canadian primary producers, steel output falls far below meeting war demands and practically all non-essential manufacturing has been suspended for the duration. Drastic curtailment in some essential finished steel materials has been necessary recently in order to make available sufficient steel for the more important war materials. While steel production is practically at capacity rolling mill operations are not on a similar basis. However, some rolling departments, such as plate mills, are running above rated capacity but to enable these schedules, steel has had to be withdrawn from other operations. Wire and nail mills have had to suffer to a large extent and there has been curtailment in operations of some bar mills as well as in bolts and nuts. With regard to nails there has been a decided shortage during the past couple of weeks and mills have withdrawn from the market, leaving it to warehouse operators to fill current orders.

As far as other lines of steel are concerned, allotments to warehouses have been falling off recently and a number state they have only small stocks.

The steel controller, who passes on all orders for plates and sheets, is directing deliveries chiefly to shipbuilding, tank and rolling stock makers, and domestic output is being augmented by large tonnages from the United States. Despite the sharply increased output of plates recently there is little chance of shipbuilding operations being stepped above present levels until greater supplies of steel are available.

Iron and steel scrap continues to attract special interest. Offerings are gaining in volume both from urban and rural areas. The betterment from the cities is due to the last minute rush of automobile wreckers to clear their yards before the deadline is reached when the government takes over all their unsold scrap, early next week. Offerings from rural districts show a more widely diversified line. In addition to substantial tonnages of steel grades, there has been improvement in supplies of agricultural cast and other iron grades.

Ferroalloys

Ferroalloy Prices, Page 122

Ferroalloy prices have been reaffirmed for third quarter, as had been expected by the trade, though a few revisions had been thought possible. The advance in ferromanganese earlier in second quarter made it unlikely a further change would be made in that material. Meanwhile demand continues heavy and an eastern producer is understood to be planning to blow in a third furnace on ferromanganese next month.

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

SUB-CONTRACT OPPORTUNITIES . . .

Data on subcontract work are issued by local offices of the Contract Distribution Branch, WPB. Contact either the office issuing the data or your nearest district office. Data on prime contracts also are issued by Contract Distribution offices, which usually have drawings and specifications, but bids should be submitted directly to contracting officers as indicated.

Philadelphia Office, Contract Distribution Branch, Production Division, WPB, Broad Street Station Building, reports the following subcontract opportunities:

11-26-1: Pennsylvania concern seeks subcontracting facilities on body for M48 fuze. Material, WDX 1314 cold-rolled steel. Tolerances, plus or minus .005. Quantity, 25,000 to 50,000 per week. Machine required, 2⅝-inch multi-spindle screw machine. Prints and specifications on file at Philadelphia office and samples at exhibit room.

11-24-1: New York company requires subcontracting facilities on adapter and striker nuts of cold-rolled steel WD 1115. Tolerance, minimum .005. Quantity, 1500 per day. Production to start as soon as possible. Machines required, 2 to 3-inch automatic screw machines or automatic turret lathes required. Prints and specifications at Philadelphia office.

13-22-1: Government is lining up facilities to produce large variety of torpedo mechanism components, including many special types of screws, tap screws, bolts and studs, special pins and hollow shafts. Material, brass, steel and stainless steel. All forgings to be furnished by prime contractor. Tolerances close. Quantity, large, production to start at once. Contract by negotiation. Equipment, turret lathes, screw machines, milling, drilling, precision grinding, heat treating and testing equipment. Prints and information at Philadelphia office.

13-22-2: Government requires subcontracting facilities for aircraft components, turnbuckle assemblies, turnbuckles turnbuckle eyes (pig and cable type), turnbuckle forms, streamlined tie assemblies, adjustable control rod ends and tie rod terminal tube clamps. Material is largely bar stock. Tolerances fairly close. Quantity varies with item, production to start as soon as possible. Equipment, stamping presses, screw machines or equivalent, light milling machines, drilling and light forging equipment, heat treating equipment. Contract by negotiation. Prints and specifications at Philadelphia office.

13-20-1: Government requires subcontracting facilities for manufacture of large number of miscellaneous small gun parts. All forgings to be furnished by prime contractor. Tolerances, precision work. Quantity based on deliveries of 500 to 1600 for indefinite period and production to start at once. Production equipment for light milling, drilling, turning and boring. Contract by negotiation. Prints and specifications at Philadelphia office.

16-20-2: A midwestern concern is looking for forging facilities for several medium sized straight shafts and crank shafts. Drawings and specifications at Philadelphia office.

16-21-1: A Philadelphia concern is looking for machining facilities to machine bar stock and forgings. Equipment needed includes drill presses, lathes, threading machines, gear-cutting machines. Drawings at Philadelphia office.

13-28-1: Government wishes to locate subcontracting facilities on aircraft radio components: 18,000 pieces antenna attachment hooks made of aluminum alloy rod; 18,000 pieces antenna fairlead, including 18,000 mycalex corona shields; 113,000 clip-mounted and 50,000 post-mounted cartridge type fuse. Production to start as soon as possible. Contract by negotiation. Prints and specifications at Philadelphia office.

16-B8-1: A Pennsylvania concern is seeking tool room facilities for manufacture of special jigs, dies and fixtures for machining bronze and steel castings and steel forging parts; also facilities for manganese bronze forging. All or part of 100,000 man-hours needed.

Chicago office, Contract Distribution Branch of WPB, 20 North Wacker Drive, is seeking contractors for the following:

64-A-522: Mid-eastern concern finds it necessary to subcontract for 6000 pieces of each of six items of fine-pitched gears, ranging from ½ to 3¾ inches diameter with pitches varying from .065-inch to 22 diametral pitch. Gears are made from cold-drawn steel and bronze castings. Equipment required will include hand screw machines with capacities from ½ to 3¾ inches for bar and chucking work, hobbing machines from .065-inch to 22 diametral pitch. Deliveries to start as soon as possible and be completed before Oct. 1. Blueprints available at this office.

66-O-522: Midwestern prime contractor is prepared to sublet a complete subassembly consisting of the training mechanism of a new type anti-tank gun. Principal machine tool requirements are 3 to 3½-inch bar horizontal boring machine, worm and worm wheel cutting equipment and bevel gear generators to cut 3-inch pitch diameter gear. Quantities, 200 assemblies per month for several months. Drawings on file at this office.

68-A-523: Wanted, small and large die and tool shops capable of making plug gages, thread and ring gages, templates, etc.

51-N-520: Navy contractor urgently needs Gleason bevel gear cutting and testing capacity (No. 6 and No. 12 cutters) about 5000 altogether needed. Lots run about 200 per size and sizes run from 2½ to 9 inches in diameter. Blanks and arbors will be furnished.

71-AN-525: A Chicago prime contractor is in need of tools, jigs and fixtures for locating tubular milling and drilling on airplane engine mounts. Construction will require toolroom with welding, grinding and lapping facilities to close tolerance limits. Some fixtures are 50 x 20 inches approximately, of welded angle iron construction. Will consider all or any. Value about $25,000. Tool shop to supply all material.

77-A-529: Prime contractor manufacturing diecast tail fins requires 210,000 liners made from 31/32-inch freecutting cold-drawn steel WDX1335 to be delivered at the rate of 30,000 to 40,000 per month. Automatic screw machines required for first operation; automatic chucking or hand screw machines for second operation. Both ends counterbored, one end threaded with internal, the other with external thread. Overall length 6 inches. No hardening or grinding required. Blueprints available at Chicago office.

80-AN-529: Chicago manufacturer requires dies for forming small aluminum parts for aircraft work.

Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:

S.C.1: Facilities of horizontal boring machines capable of doing very accurate work are required, able to take work up to 30-inch cube.

S.C.2: Facilities are required to tap ⅛ x ⅜-inch, ⅜ x ½-inch and ½ x ¾-inch I.P.S. steel pipe bushings in lots of 100,000 pieces. Tool required to do work economically is an automatic tapping machine or equivalent in production ability.

SC-4: Manufacturer of precision aviation, marine and fire control instruments desires services of an organization who can undertake design, manufacture and delivery of jigs, fixtures and gages to extremely precise tolerances. Such organizations requested to communicate with nearest WPB office immediately.

SC-5: Facilities are required to forge lapwelding ¾-inch steel heads to 13/32-inch steel cylinders 30 inches in diameter in accordance with ICC shipping container specification 106A500.

SC-6: Massachusetts concern requires facilities for milling and grinding threads from 3/16 to 1⅛-inch, about 400 pieces to mill and grind.

SC-7: Facilities are wanted for bevel and worm gear cutting. Concerns applying must also be able to machine blanks from raw state, such as bar stock or rough casting.

SC-8: Horizontal boring mills capable of doing accurate work are wanted to take pieces up to 30-inch cube. Prime contractor needs 500 to 1000 machine hours in the next four to five weeks.

SC-9: Connecticut manufacturer re-

quires subcontracting sources for work on high-speed steel. On the basis of present contract, orders will approximate 200 pieces per month and carry A-1-a priority. All following equipment will be required: bench lathes, No. 1 milling machines with index head, external grinders 4 x 10-inch, and hardening equipment.

SC-10: Massachusetts concern requires subcontracting sources on press for powder metallurgy operations, 200,000 pounds per square inch, automatic pressure control die approximately 1-inch diameter; 25 pieces per minute required.

SC-13: A Connecticut manufacturer of marine valves and fittings desires to place large dollar value orders for job shop production of composition pressure castings to Navy department specification mixtures. Foundry must have 1000-pound pouring capacity per day or better. Weight of castings is from 5 to 200 pounds and test pressures from 125 to 250 pounds per square inch. Subcontractor will be supplied with patterns and given educational assistance as he has facilities and basic foundry knowledge of pressure casting work. Inquiries by letter to nearest WPB office, giving full description of facilities.

SC-14: Boston concern requires the facilities of multi-spindle automatics capable of machining ⅜-inch hexagon and/or ½-inch round, cupro-nickel rods to tolerances of plus or minus .004. Prime contractor will take entire production of several machines and will supply all materials.

Milwaukee office, Contract Distribution Branch of WPB, 161 West Wisconsin avenue, Milwaukee, Wis., is seeking contractors for the following:

WP208: Sheave block manufacturing facilities urgently needed immediately for 3000 double block with standing eye, mild steel sheaves, and 3000 snatch blocks with swivel eye, phosphor bronze sheave.

WP209: Urgent and immediate need for contractor producing welding equipment, including: 150-KVA circumferential seam welder with controls, for 60-cycle, 220 or 440-volt current; 150-KVA universal seam welder with controls, 220 or 440-volt; 125-KVA projection welding press, same current; 50-KVA production-type motor-driven spot welder, same current; 50-KVA production-type motor-driven spot welder, minimum throat depth 12 inches. Minimum of machine above 24 inches.

WP200: Prime has screw machine work to subcontract in manufacture of three parts with A-1-a priority: ⅝-inch nose adapter turned from steel tubing, with 30-degree chamfer and 11½ threads per inch, inside thread with 1.61 pitch diameter. Fuze adapter turned from 1¾-inch hexagon bar steel, 2.12-inches long, with 20-degree chamfer and internal threading. Sleeve adapter turned from steel tubing has inside diameter of 1.16-inch and length of .30-inch. Has external thread and milled slot in face.

Minneapolis office, Contract Distribution Branch of WPB, 326 Midland Bank building, is seeking contractors for the following:

S.O. No. 210: Machining of rings. Three sizes of machines needed, turret lathes, small boring mills or Bullard multimatic. Quantities, small size, 25 to 300 per day; potential medium size, 75 per week; large size, 120 per week. Blueprints and sample available.

S.O. No. 204: Midwest engine builder wants diesel cylinder heads machined. Operations include milling, drilling, reaming, boring and grinding of valve seats. Iron castings furnished; 1000 required from one model, 600 of another. First delivery of 200 July 1. Drawings and route sheets at this office.

S.O. No. 205: Local Navy contractor urgently needs Gleason bevel gear cutting and testing capacity (No. 6 and No. 12 cutters) about 5000 altogether needed. Lots run about 200 per size and sizes run from 2½ to 9-inch diameter. Blanks and arbors will be furnished.

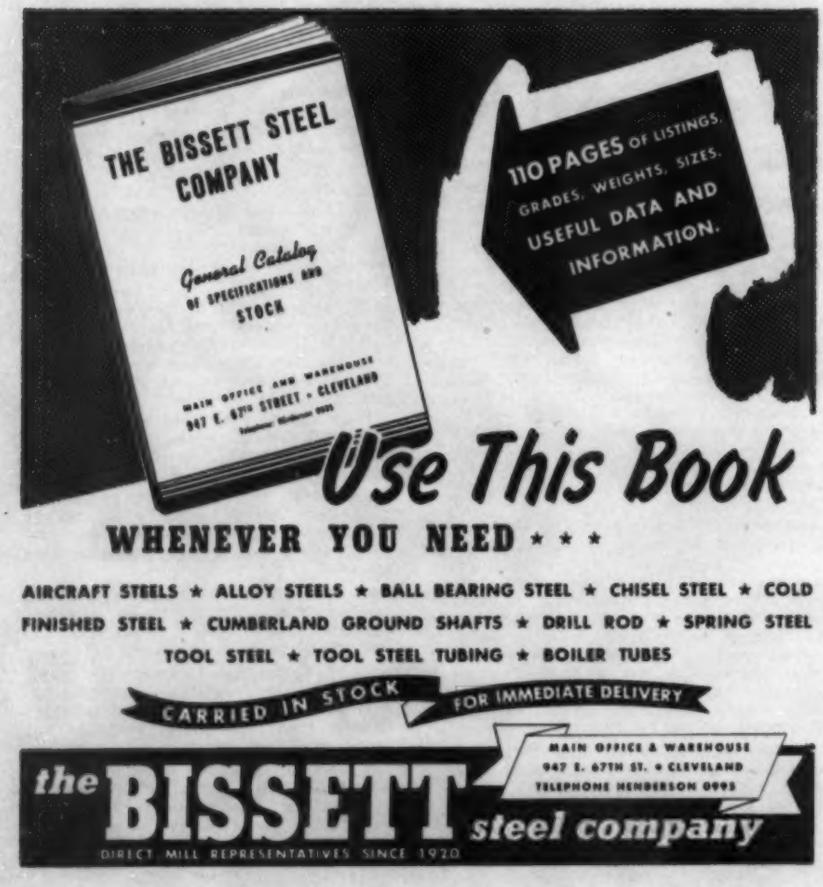
S.O. No. 208: Drawings available for several small parts, work to be done on automatic or hand screw machines. Urgently needed. AA priorities.

S.O. No. 209: Drawings available at this office on machining of following tank parts: Secondary annulus, sprocket head and outer member. Quantities 500 to 1500 each. Forgings furnished. Requires 18 to 24-inch turret lathes, internal gear cutting and splining.

Cleveland office, Division of Contract Distribution, WPB, Union Commerce building, is seeking contractors for the following:

1-S-155: Subcontractor with single-spindle automatic screw machines and heat treating facilities to furnish two parts. Operations: Turn, thread and heat treat first part; form, thread drill and top second part. Material, first part ½-inch diameter SAE 3135 steel, second part ½-inch hex SAE 1112 steel. Minimum tolerance .003. Quantity 46,500 and 4600 pieces, respectively. Blueprints on file.

4-S-3: Subcontractor with thread grinding equipment, J & L, Ex-Cell-O type, or equivalent, to grind threads on four items ¼-20 P.D.; also .494 P.D. 32 thread; and 498 P.D., 48 thread. Material, stainless steel. Delivery requirements, 100 June, 300 July, 400 August, 600 September, 800 October, 1000 November. For further information write Dayton, O., office of War Production Board.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STRUCTURAL SHAPES .

SHAPE CONTRACTS PLACED

10,000 tons, government depot, Virginia, to Bethlehem Steel Co., Bethlehem, Pa.; Karl Koch Erecting Co., New York, erecting; Doyle & Russell, Richmond, Va., contractors.

2000 tons, aluminum plant in South, to Virginia Bridge Co., Roanoke, Va.

350 tons, shipyard, Providence, R. I., Rheem Mfg. Co., to Providence district shop; Brown & Matthews Co., New York, contractor.

261 tons, refinery expansion, Standard Oil Co., Wood River, Ill., to Vincennes Steel Corp., Vincennes, Ind.

150 tons, addition, Acme Steel & Malleable Iron Works, Buffalo, to R. S. McMannus Steel Construction Co., Buffalo.

100 tons or more, six bridge cranes, navy yard, Washington, to Harnischfeger Corp., Milwaukee, $136,050, spec. 10880; also 14 wall cranes and four bridge cranes, navy yard, Puget Sound, and one bridge crane, Washington, to Shepard-Niles Crane & Hoist Co., Montour Falls, N. Y., $167,281.75.

Unstated, dry dock cranes for Navy yards, to Star Iron & Steel Co., Tacoma, low at $491,000.

Unstated, bridge cranes for navy project in Idaho, to Harnischfeger Corp., Milwaukee; $200,000 contract.

Unstated, hangars at four Washington-

SHAPE AWARDS COMPARED

	Tons
Week ended June 13	12,861
Week ended June 6	11,691
Week ended May 30	5,000
This week, 1941	11,926
Weekly average, 1942	27,617
Weekly average, 1941	27,373
Weekly average, May, 1942	15,336
Total to date, 1941	708,438
Total to date, 1942	635,203

Includes awards of 100 tons or more.

Oregon air bases; awarded by U. S. engineer, Portland, to L. L. Quigley, Julius Johnson, Portland; C. W. Watkins, Boise and Hawkins & Armstrong, Seattle; details not announced.

SHAPE CONTRACTS PENDING

500 tons, building, shipyard, Virginia; project suspended.

REINFORCING BARS . .

REINFORCING STEEL AWARDS

12,000 tons, airplane engine plant, Chrysler Corp., divided equally between Bethlehem Steel Co., Bethlehem, Pa., Truscon Steel Co., Youngstown, O., Concrete Steel Co., Chicago and Ceco Steel Products Corp., Chicago; George A. Fuller Co., Chicago, contractor; bids May 20.

1200 tons, three plants for manufacture of aircraft engine parts, United Aircraft Corp., Pratt & Whitney division, New England points, to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., Boston, contractor.

1000 tons, 12 fuel oil storage tanks, underground, Bureau of Yards & Docks, Navy department, to Bancroft & Martin Rolling Mills Co., Portland, Me., and Concrete Steel Co., Boston; Monroe & Tompkins Co., contractors.

500 tons, construction spec. 10847, Bureau of Yards & Docks, Navy department, South Carolina, to Atlanta Steel Co., Atlanta; C. M. Guest & Co., Anderson, S. C., contractor; Southern Engineering Co., Charlotte, N. C., awarded 50 tons, structural steel.

500 tons, government depot, Virginia, to Virginia Steel Co., Richmond; Doyle & Russell, Richmond, Va., contractors.

450 tons, expansion, Allison Engine Division, General Motors Corp., to Truscon Steel Co., Youngstown, O., Concrete Fireproofing Co., contractor.

385 tons, toluene plant, Standard Oil Co. of Indiana, Whiting, Ind., to Joseph T. Ryerson & Son Inc., Chicago; Wenzel & Hencock Co., Milwaukee, contractor.

250 tons, power development, Ft. Peck, Mont., to Truscon Steel Co., Youngstown, O.; Fegles Construction Co., Minneapolis, contractor.

CONCRETE BARS COMPARED

	Tons
Week ended June 13	16,392
Week ended June 6	1,962
Week ended May 30	850
This week, 1941	7,679
Weekly average, 1942	10,285
Weekly average, 1941	13,609
Weekly average, May, 1942	6,010
Total to date, 1941	274,598
Total to date, 1942	226,286

Includes awards of 100 tons or more.

104 tons, bridge project, DA-WR-9-A (1), Oklahoma City, Okla., to Sheffield Steel Corp., Kansas City, Mo., through Capital Steel Co., Little Rock, Ark.; Moren & Buckner, contractors.

REINFORCING STEEL PENDING

1245 tons, Panama, sch. 6278, Youngstown Sheet & Tube Co., Youngstown, O., low.

600 tons, Sangamon Ordnance plant, Illinois, for war department, James Stewart Corp., Chicago, contractor; bids June 12.

550 tons, expansion Ross dam, Skagit power project; bids in to Seattle, June 11.

Unstated, Anderson Ranch dam, Idaho; bids to Denver, June 8.

PIPE . . .

CAST PIPE PENDING

1425 tons, 10 to 30-inch, Portsmouth, Va.; bids in.

PLATES . . .

PLATE CONTRACTS PENDING

500 tons or more, outlet pipes and penstocks, Alder and LaGrande dams; Western Pipe & Steel Co., San Francisco, low to Tacoma Board of Contracts, $70,384.

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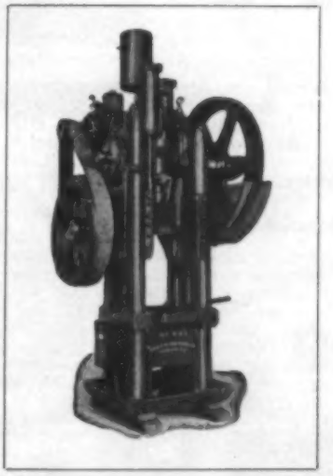

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CONSTRUCTION AND ENTERPRISE...

Ohio

ASHTABULA, O.—Newly formed partnership of seven will operate former Phoenix Foundry & Machine Co., 620 West Forty-eighth street, under name of Phoenix Machine & Foundry Co. Principal officers are Levi Swedenberg, superintendent, and Parker M. Lott, business manager.

CINCINNATI—Cincinnati Milling Machine Co. plans immediate work on building, 107 x 250 feet, in a manufacturing expansion program. It will also erect a $70,000 storage structure.

CINCINNATI—Corps of Engineers, Ohio River Division, 1420 Enquirer building, Cincinnati, will supervise construction of $3,000,000 manufacturing plant in Tennessee for War Department.

CLEVELAND—Negotiated bids are being taken by United States Army engineers, 700 Union Guardian building, Detroit, for construction of bomber plant to be operated by Fisher Body Division of General Motors Corp., located near here.

CLEVELAND—Pierce Die Co., 1390 East Forty-ninth street, is adding 1700 square feet to plant.

CLEVELAND—Marquette Metal Products Co., 1145 Galewood drive, has let contract for one-story 89 x 160-foot factory and two-story office building to Alger-Rau Inc., 12434 Cedar road. Estimated cost $85,000. F. Eroskey, 7829 Euclid avenue, engineer. (Noted May 4).

CLEVELAND—Ohio Crankshaft Co., 400 Harvard avenue, plans immediate construction of $1,000,000 federal government-financed plant. (Noted May 25).

CLEVELAND—Art Galvanizing Works, Walter L. Klein, 3925 Valley road, will add to production space with $10,000 factory building.

CLEVELAND—Allyne-Ryan Foundry Co., Aetna road and East Ninety-first street, has awarded contract for alterations to its plant to John Woide, 1659 East Eighty-sixth street. Estimated cost $40,000. (Noted June 1).

COLUMBUS, O.—McGeorge & Hargett, 9400 Quincy avenue, Cleveland, engineers, are taking bids for two factory buildings of 200,000 square feet each for Timken Roller Bearing Co. Estimated cost $700,000.

ELYRIA, O.—Elyria Automatic Screw Machine Inc. has been organized to deal in metal machines and products. Glen A. Rogers, 112 East Bridge avenue, and J. J. Hengesbaugh, are handling details of incorporation.

TOLEDO, O.—Lycoming Motors Corp. will erect a $7,000,000 plant adjoining that of American Propeller Corp. on Laskey road. Both companies are subsidiaries of Aviation Corp. of America.

Massachusetts

WEST SPRINGFIELD, MASS.—Perkins Machine & Gear Co. has awarded contract to E. J. Pinney Co. Inc., 220 Dwight street, Springfield, for one-story 150 x 400-foot manufacturing unit and two-story 50 x 90-foot office building. Estimated cost $200,000. McClintock & Craig Inc., 458 Bridge street, Springfield, engineer.

Connecticut

BRIDGEPORT, CONN.—United Illuminating Co., 119 Broad street, has let contract for power plant superstructure to Gellatly Construction Co., Bridgeport. (Noted June 8).

NEW HAVEN, CONN.—New Haven Malleable Iron Co. has awarded contract for factory addition to J. N. Leonard & Co., 902 Chapel street.

New York

NEW YORK—George A. Fuller Co., 597 Madison avenue, has contract for $1,100,000 plant for Defense Plant Corp. Walker & Gillette, 597 Madison avenue, architects.

New Jersey

BLOOMFIELD, N. J.—Westinghouse

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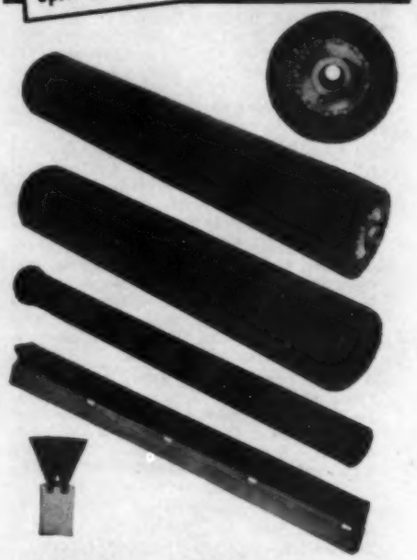

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BRIDGEPORT, CONNECTICUT

Electric & Mfg. Co., East Pittsburgh, Pa., has let contract for additions to plants Nos. 8 and 10 and to lamp works, to Salmond-Scrimshaw Construction Co., 526 Elm street, Arlington, N. J. Estimated cost $85,000.

HIGH BRIDGE, N. J.—Taylor-Wharton Iron & Steel Co., care of L. E. Crampton, High Bridge, plans power house and storage shed costing $75,000.

NEWARK, N. J.—Federated Metals Division of American Smelting & Refining Co., 150 St. Charles street, has let contract for one-story electric precipitation plant building, gas treater building, power house, concrete spray chamber, settling chamber, to W. J. Wilck, 280 Hobart street, Perth Amboy, N. J. Estimated cost $50,000.

Michigan

DETROIT—Cogsdill Twist Drill Co. will erect factory and office building on Eight Mile road. Paul Sewell, Detroit, architect.

DETROIT—Sterling Gauge Co. will erect shop building on Van Dyke avenue. Paul Sewell, Detroit, architect.

DETROIT—Packard Motor Car Co. will erect 200 x 300-foot addition to factory, consisting of additional test cells and manufacturing unit.

DETROIT—Bohn Aluminum & Brass Corp. will erect core room addition and an aluminum engineering shop addition to its Hart avenue plant, costing $28,000 and $18,000, respectively.

MUSKEGON, MICH.—Anaconda Wire & Cable Co., Muskegon, has let contract to David L. Green, Muskegon, for $50,000 second-story addition to plant.

TECUMSEH, MICH.—Hahn & Hayes, Toledo, O., architects, are preparing plans for plant here for Tecumseh Mfg. Co., estimated to cost $50,000.

Pennsylvania

CHAMBERSBURG, PA.—Chambersburg Engineering Co. plans 80 x 300-foot machine shop. Estimated cost $50,000.

ERIE, PA.—Erie Lighting Co. has let contract for power plant addition to Sessinghaus & Ostergaard Inc., 1115 Peach street, Erie. Approximate cost $400,000. E. M. Gilbert Engineering Co., 412 Washington street, Reading, Pa., engineer.

PITTSBURGH—National Supply Co., Grant building, has awarded subcontracts for manufacturing and power plant in Beaver county, Pa.

Illinois

CHICAGO—V. L. Charn, 141 West Jackson boulevard, architect, and J. K. Johnson and J. B. Black, 520 North Michigan avenue, engineers, have been selected to prepare plans for a $750,000 project in Illinois, to be federal financed.

CHICAGO—Central Architectural Iron Works, 3105 West Twenty-seventh street, has leased a one-story building containing 62,800 square feet at 4427 North Knox avenue, to be used for manufacture of iron and steel products for aircraft, and will supplement the company's present plant.

CHICAGO—P. J. Bukowski, chief examiner for the Reconstruction Finance Corp. in the Chicago district, announces a rubber plant covering 1000 acres will be built at West Gary, and will be operated by Rubber Synthetic Inc., formed by Standard Oil of Indiana.

CHICAGO—An industrial company has plans by Schmidt, Garden & Erikson, 104 South Michigan avenue, for one-story steel manufacturing plant costing over $1,000,000. H. J. Maveety, 53 West Jackson boulevard, structural engineer.

HARVEY, ILL.—Whiting Corp. has awarded contract to Kaiser-Ducett Co., 80 East Jackson boulevard, Chicago, for manufacturing and office units costing $325,000. (Noted May 25).

MATTOON, ILL.—Illinois Central railroad plans to spend about $48,000 on improvements to its shops here.

Indiana

SOUTH BEND, IND.—South Bend Tool & Die Corp. is rebuilding portion of plant destroyed by fire. Cost $40,000, including equipment.

Kentucky

LOUISVILLE, KY.—Joseph E. Seagram & Sons Co., H. Fred Wilkie, vice president in charge of plant operation, plans rubber plant adjoining company's present distilleries to produce butadiene for synthetic rubber from al-

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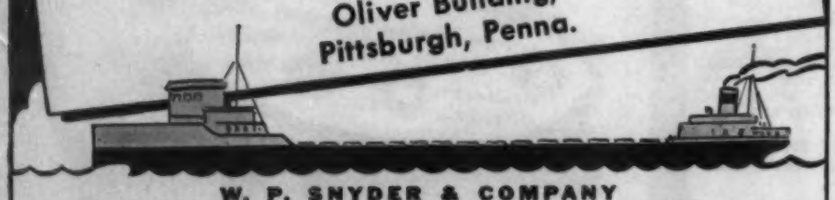

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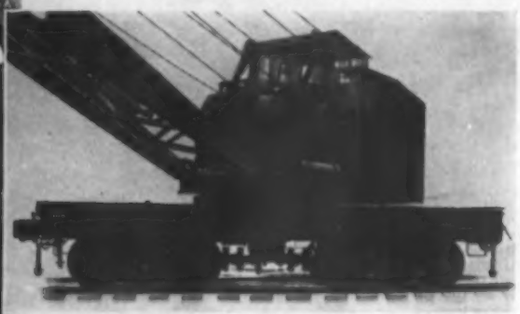

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Tennessee

HARRIMAN, TENN. — Robinson-Evans Milling Co. is rebuilding mill and elevator destroyed by fire. Estimated cost, including equipment, $50,000.

North Carolina

GREENSBORO, N. C.—Morton Chemical Co., 2110 High Point road, has acquired adjoining building and will install equipment.

Missouri

KANSAS CITY, MO.—Massman Construction Co., B.M.A. building, has received general contract for industrial plant to produce war materials, costing about $3,000,000 with equipment.

ST. LOUIS—L. O. Stocker Co., Arcade building, St. Louis, has received general contract for industrial plant to be located in Tennessee. Cost $3,000,000. W. K. Knight & Co., Wainwright building, St. Louis, engineer in charge of plans.

Oklahoma

DUNCAN, OKLA.—Lloyd Freese, vice president, Bell Oil & Gas Co., Tulsa, Okla.; L. B. Simmons, president, Rock Island Refinery Co., Duncan, and associates have organized Associated Refineries Inc., to erect and operate $10,000,000 high octane refinery near Duncan.

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Wisconsin

WEST ALLIS, WIS.—Standard Gage & Tool Corp., 6822 Burnham street, has let general contract for 44 x 104-foot factory and office building to H. C. Breest, 2406 West Keefe avenue, Milwaukee. R. E. Oberst, 2659 West Twenty-seventh street, Milwaukee, architect.

Texas

BRADY, TEX.—Mineral Production Co., care of B. Brown, Georgetown, plans expansion of facilities for manganese ore mine. Estimated cost $70,000.

EL PASO, TEX.—J. E. Morgan & Sons, 210 North Campbell street, El Paso, has contract for addition to refinery for Phelps-Dodge Corp., care of Wilbur Jurden, chief engineer, North Loop road. Estimated cost $2,650,000.

HOUSTON, TEX.—Humble Oil & Refining Co., Humble building, Houston, will erect two plants in connection with production of synthetic rubber; total cost $43,000,000.

Colorado

DENVER—Anderson Mfg. Co., 1219 California street, will soon take bids for one-story 70 x 150-foot tile plant costing approximately $40,000. G. D. White, 615 Columbine street, architect.

California

OAKDALE, CALIF.—A site of approximately 320 acres near here has been selected by Reconstruction Finance Corp. and Defense Plant Corp. for erection of a $12,000,000 aluminum plant to be operated by Aluminum Co. of America.

OAKLAND, CALIF.—Lorimer Diesel Engine Co., 1530 Wood street, has awarded contract for plant additions to L. W. Roth, 1340 East Thirty-eighth street. Estimated cost $45,000. A. Froberg, 3454 Harlan street, architect.

LOS ANGELES—Younglove & Spaulding Mfg. Co. will build an addition to its machine shop at 3524 Union Pacific avenue.

SAN FRANCISCO—Pacific Foundry Co., 3100 Nineteenth street, has awarded contract for foundry to A. T. Wilhelm, 666 Mission street. Cost over $40,000.

SAN LEANDRO, CALIF.—Nelsons Specialty Co., care of Miller & Warnecke, Financial Center building, Oakland, has let contract for factory to D. W. Nicholson, 1701 San Leandro boulevard. Estimated cost $42,000.

SAN FRANCISCO—Bowie Switch Co., Tennessee street, has plans completed by W. Mooser, 2444 Kearney street, for factory addition costing $40,000. (Noted May 25).

SUNNYVALE, CALIF.—An appropriation of $4,000,000 has been authorized by Defense Plant Corp. for expansion of the Joshua Hendy Iron Works here.

VERNON, CALIF.—Aluminum Corp. of America, 5151 Alcoa avenue, has awarded contract for 120 x 200-foot machine shop. Cost $75,000. (Noted May 11).

Washington

KIRKLAND, WASH.—City has rejected bids for treatment plant and new bids will be called under revised plans.

Canada

CORNWALL, ONT.—Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, has acquired a 320-acre site here and is having plans

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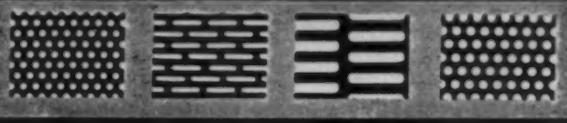

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prepared for construction of war plant estimated to cost about $3,000,000.

HAMILTON, ONT.—United Gas & Fuel Co. of Hamilton Ltd., 82 King street East, has been authorized by Department of Munitions and Supply to proceed with installation of $2,000,000 coke oven assembly here. Coal Carbonizing Co., St. Louis, will have charge of installation and is receiving bids through J. E. Maconiche, assistant to president, 66 King street East, Hamilton, for foundations and other construction work.

LONDON, ONT.—James Carsons & Sons, 342 Ridout street, is having plans prepared by W. G. Murray, architect, Bank of Toronto building, Richmond street, and bids will be called for machine shop to cost about $30,000, including equipment.

OTTAWA, ONT.—Campbell Motors (Ottawa) Ltd., 285 Laurier avenue, has given general contract to Doran Construction Co. Ltd., 78 Bank street, for plant alterations and addition to cost about $10,000.

TORONTO, ONT.—John Inglis Co. Ltd., 14 Strachan avenue, has given general contract to A. W. Robertson Ltd., 57 Bloor street West, for maintenance building on Hanna avenue to cost $150,000. Plans by Allward & Gouinlock, architects, 57 Bloor street West.

TORONTO, ONT.—Canadian General Electric Co. Ltd., King and Simcoe streets, has started work on addition to Davenport works, 830 Lansdowne avenue, and has given contract to Pendrith Machinery Co. Ltd., 775 King street West, for supply and installation of machinery and drying ovens.

TORONTO, ONT.—Rogers Majestic (1941) Ltd., Fleet street West at Bathurst street, has given general contract to Carr & Barnes Ltd., 481 Eglington avenue, for plant addition to cost about $75,000. J. E. Hoare Jr., 481 Eglington avenue West, architect.

SCARBOROUGH JUNCTION, (TORONTO), ONT.—Burlec Ltd. has had plans prepared and will call bids at once for plant addition to cost about $15,000.

ST. CATHARINES, ONT.—McKinnon Industries Ltd., Ontario street, is having plans prepared by A. E. Nicholson, architect, 46 Queen street, for two additional plant buildings to cost about $30,000.

WELLAND, ONT.—Page Hersey Tubes Ltd., Church street, Toronto, has plans by Margison & Babcock, 210 Dundas street West, and has given general contract to Dickie Construction Co. Ltd., 17 Yorkville avenue, Toronto, for addition to plant to cost about $100,000, with equipment.

WINDSOR, ONT.—Dominion Twist Drill Ltd., 1858 Assumption street, Walkerville, Ont., is receiving bids through J. C. Pennington, architect, Bank of Commerce building, for one-story plant addition to cost about $150,000, with equipment.

WINDSOR, ONT.—Standard Machine & Tool Co. Ltd., 870 Ottawa street, is taking bids through J. C. Pennington, architect, Bank of Commerce building, for plant addition and installation of ten-ton crane, to cost about $50,000.

ST. JOHN, N. B.—E. S. Stephenson & Co. Ltd., 17 Nelson street, has had plans prepared and will call bids for construction of machine shop to cost $25,000 with equipment.

BEAUHARNOIS, QUE.—Aluminum Co. of Canada Ltd., Sun Life building, Montreal, has given general contract to Anglin Norcross, Quebec Ltd., 892 Sherbrooke street West, Montreal, for plant to cost about $1,000,000.

BEAUHARNOIS, QUE.—St. Lawrence Alloys & Metals Ltd. is taking bids through Ross & Macdonald, architects, 1010 St. Catharine street West, Montreal, for plant addition to cost about $60,000 with equipment.

LA TUQUE, QUE.—Aluminum Co. of Canada Ltd., Sun Life building, Montreal, is considering plans for plant here to cost about $3,000,000.

MONTREAL, QUE.—Canadian Liquid Air Co. Ltd., 1111 Beaver Hall Hill, has given general contract to Kredl Bros., 1992 Champagneur avenue, for plant addition to cost about $50,000, with equipment. Pierre M. d'Allemagne, 335 Berwick avenue, is consulting engineer.

MONTREAL, QUE.—Noorduyn Aircraft Ltd., Boise Franc road, in association with Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, has given general contract to Richard and E. J. Ryan Ltd., 1808 William street, for addition to plant costing $615,000.

ST. JOHNS, QUE.—Canadian Potteries Ltd., 5 Mackenzie King avenue, has had plans prepared and will call bids for plant addition to cost about $25,000 with equipment. Walter J. Armstrong, 1010 St. Catharine street West, Montreal, is consulting engineer.

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Dear Pop:

Even an old Rainbow Divisioner like you would pop your eyes at the army we're putting together this time. Let me tell you, they're doing everything to make up just about the best bunch of fighting galoots you ever saw.

And that goes for what they do for us off duty, too! Take this new clubhouse we got just outside of camp. It's got radios, dance floors, nice soft chairs and everything. And, Pop, you can get something to eat that won't cost you a month's pay!

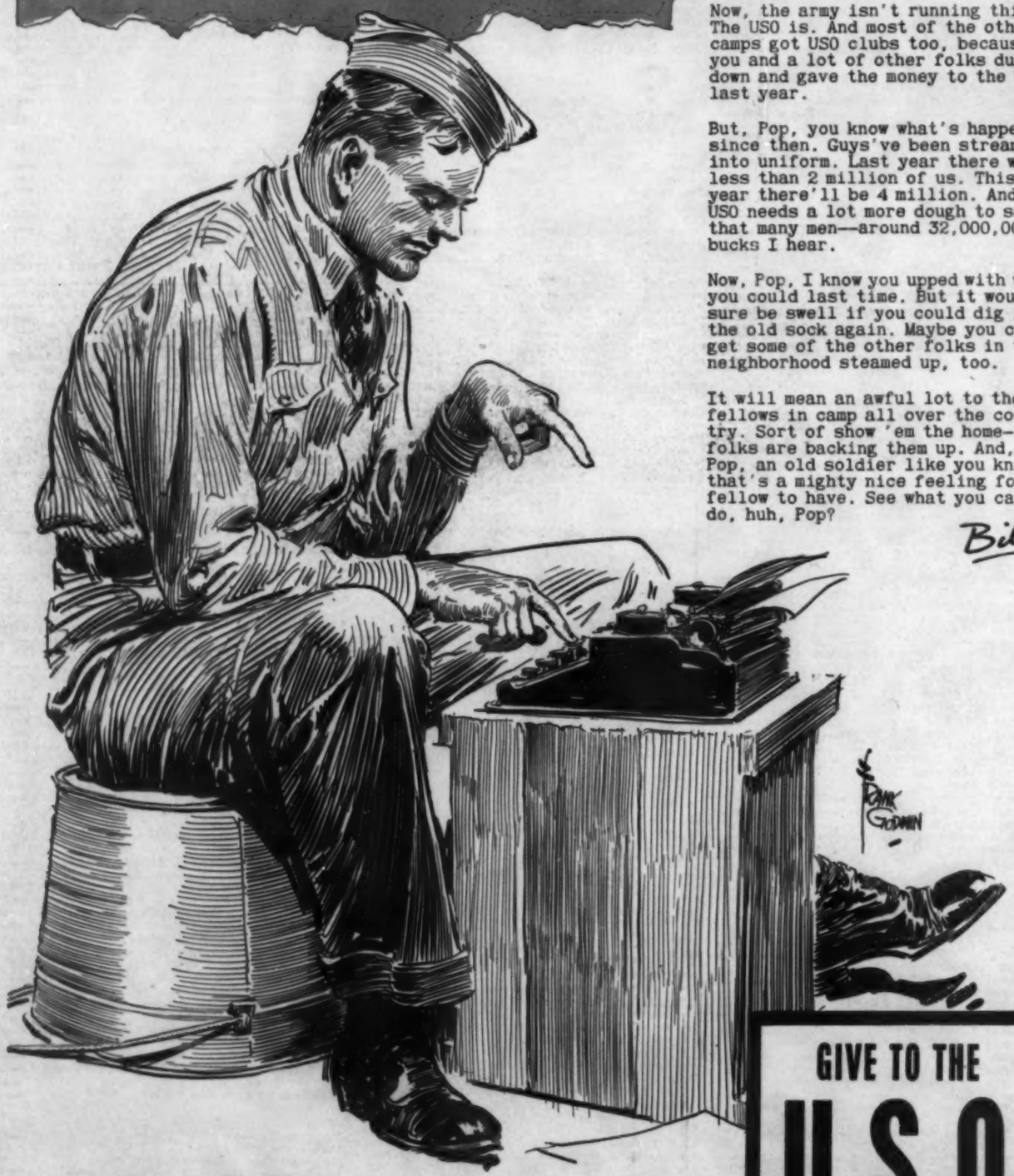
Now, the army isn't running this. The USO is. And most of the other camps got USO clubs too, because you and a lot of other folks dug down and gave the money to the USO last year.

But, Pop, you know what's happened since then. Guys've been streaming into uniform. Last year there was less than 2 million of us. This year there'll be 4 million. And the USO needs a lot more dough to serve that many men—around 32,000,000 bucks I hear.

Now, Pop, I know you upped with what you could last time. But it would sure be swell if you could dig into the old sock again. Maybe you could get some of the other folks in the neighborhood steamed up, too.

It will mean an awful lot to the fellows in camp all over the country. Sort of show 'em the homefolks are backing them up. And, Pop, an old soldier like you knows that's a mighty nice feeling for a fellow to have. See what you can do, huh, Pop?

Bill



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